

# SPURIOUS CONDUCTED EMISSIONS - IN-BAND



XMIT 2022.02.07.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

## TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17
Block - DC	Fairview Microwave	SD3239	ANC	2022-03-02	2023-03-02
Block - DC	Fairview Microwave	SD3379	AMT	2021-09-14	2022-09-14
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2022-01-17	2023-01-17

## TEST DESCRIPTION

The antenna port spurious emissions were measured at the RF output terminal of the EUT through 4 different attenuation configurations which continues through to the RF input of the spectrum analyzer. Analyzer plots utilizing a resolution bandwidth called out by the client's test plan were made for each modulation type from 9 KHz to 22 GHz. The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, were investigated to ensure they were less than the limits also called out by the client's test plan shown below.

The measurement methods are detailed in KDB971168 D01v03 section 6 and ANSI C63.26-2015.

Per FCC 2.1057(a)(1) and RSS Gen 6.13, the upper level of measurement is the 10th harmonic of the highest fundamental frequency.

These measurements are for frequency band after the first 1.0 MHz bands immediately outside and adjacent to the frequency block.

Per section FCC 24.238(a), RSS-133 6.5 (ii), the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm for a 1 MHz measurement bandwidth. The limit is adjusted to -19 dBm [-13 dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter. RF conducted emissions testing was performed on one port. All four AFHII antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification report) and port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i and 6.4.

Per section FCC 27.53(h)(1), RSS-139 6.6 and RSS-170 5.4 & 5.4.1.2, the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm for a 1 MHz measurement bandwidth. The limit is adjusted to -19 dBm [-13 dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter.

The limit for the 9kHz to 150kHz frequency range was adjusted to -49dBm to correct for a spectrum analyzer RBW of 1kHz versus required RBW of 1MHz [i.e.: -49dBm = -19dBm -10log(1MHz/1kHz)]. The limit for the 150kHz to 20MHz frequency range was adjusted to -39dBm to correct for a spectrum analyzer RBW of 10kHz versus required RBW of 1MHz [i.e.: -39dBm = -19dBm -10log(1MHz/10kHz)]. The required limit of -19dBm with a RBW of > 1MHz was used for all other frequency ranges.

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Tel: 2021.12.14.1 XMIT: 2022.02.07.0

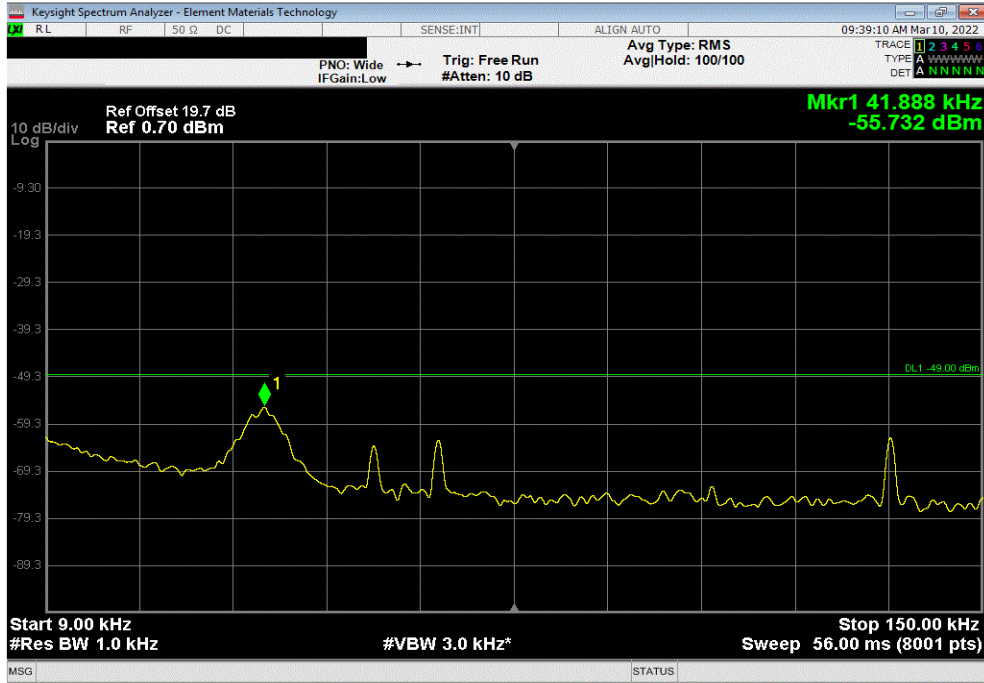
EUT: AHFII Remote Radio Head		Work Order: NOKI0037	
Serial Number: YK214000036		Date: 18-Mar-22	
Customer: Nokia Solutions and Networks		Temperature: 22.1 °C	
Attendees: David Le, John Rattanavong		Humidity: 40.1% RH	
Project: None		Barometric Pres.: 1017 mbar	
Tested by: Brandon Hobbs		Power: 54 VDC	
Job Site: TX01			
<b>TEST SPECIFICATIONS</b>			
FCC 27:2022		ANSI C63.26:2015	
RSS-139 Issue 3:2015		RSS-139 Issue 3:2015	
FCC 24E:2022		ANSI C63.26:2015	
RSS-133 Issue 6: 2013+A1:2018		RSS-132 Issue 3:2013	
RSS-170 Issue 3:2015		RSS-170 Issue 3:2015	
COMMENTS: All measurement path losses accounted for in the reference level offset including any attenuators, filters, and DC blocks. Band 25 carriers enabled at maximum power is 80 watts/carrier. The Band DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	1,2,3,4	Signature	
		Frequency Range	Max Value (dBm) Limit < (dBm) Result
Band 25, 1930 MHz - 1995 MHz, LTE Inband			
Port 1			
5 MHz Bandwidth			
E-TM 1.1 with N-TM Modulation			
	Mid Channel, 1962.5 MHz	9 kHz - 150 kHz	-55.7 -49 Pass
	Mid Channel, 1962.5 MHz	150 kHz - 20 MHz	-52.6 -39 Pass
	Mid Channel, 1962.5 MHz	20 MHz - 3.5 GHz	-25.7 -30 Pass
	Mid Channel, 1962.5 MHz	1.9 GHz - 2.2 GHz	-25.6 -30 Pass
	Mid Channel, 1962.5 MHz	3.5 GHz - 13 GHz	-38.3 -30 Pass
	Mid Channel, 1962.5 MHz	13 GHz - 22 GHz	-25.7 -30 Pass
10 MHz Bandwidth			
E-TM 1.1 with N-TM Modulation			
	Mid Channel, 1962.5 MHz	9 kHz - 150 kHz	-59.3 -49 Pass
	Mid Channel, 1962.5 MHz	150 kHz - 20 MHz	-53.9 -39 Pass
	Mid Channel, 1962.5 MHz	20 MHz - 3.5 GHz	-26.2 -30 Pass
	Mid Channel, 1962.5 MHz	1.9 GHz - 2.2 GHz	-25.1 -30 Pass
	Mid Channel, 1962.5 MHz	3.5 GHz - 13 GHz	-38.0 -30 Pass
	Mid Channel, 1962.5 MHz	13 GHz - 22 GHz	-25.8 -30 Pass
15 MHz Bandwidth			
E-TM 1.1 with N-TM Modulation			
	Mid Channel, 1962.5 MHz	9 kHz - 150 kHz	-59.9 -49 Pass
	Mid Channel, 1962.5 MHz	150 kHz - 20 MHz	-53.0 -39 Pass
	Mid Channel, 1962.5 MHz	20 MHz - 3.5 GHz	-25.7 -30 Pass
	Mid Channel, 1962.5 MHz	1.9 GHz - 2.2 GHz	-24.1 -30 Pass
	Mid Channel, 1962.5 MHz	3.5 GHz - 13 GHz	-38.0 -30 Pass
	Mid Channel, 1962.5 MHz	13 GHz - 22 GHz	-25.8 -30 Pass
20 MHz Bandwidth			
E-TM 1.1 with N-TM Modulation			
	Mid Channel, 1962.5 MHz	9 kHz - 150 kHz	-62.0 -49 Pass
	Mid Channel, 1962.5 MHz	150 kHz - 20 MHz	-52.8 -39 Pass
	Mid Channel, 1962.5 MHz	20 MHz - 3.5 GHz	-25.9 -30 Pass
	Mid Channel, 1962.5 MHz	1.9 GHz - 2.2 GHz	-24.8 -30 Pass
	Mid Channel, 1962.5 MHz	3.5 GHz - 13 GHz	-38.2 -30 Pass
	Mid Channel, 1962.5 MHz	13 GHz - 22 GHz	-25.8 -30 Pass

# SPURIOUS CONDUCTED EMISSIONS - IN-BAND

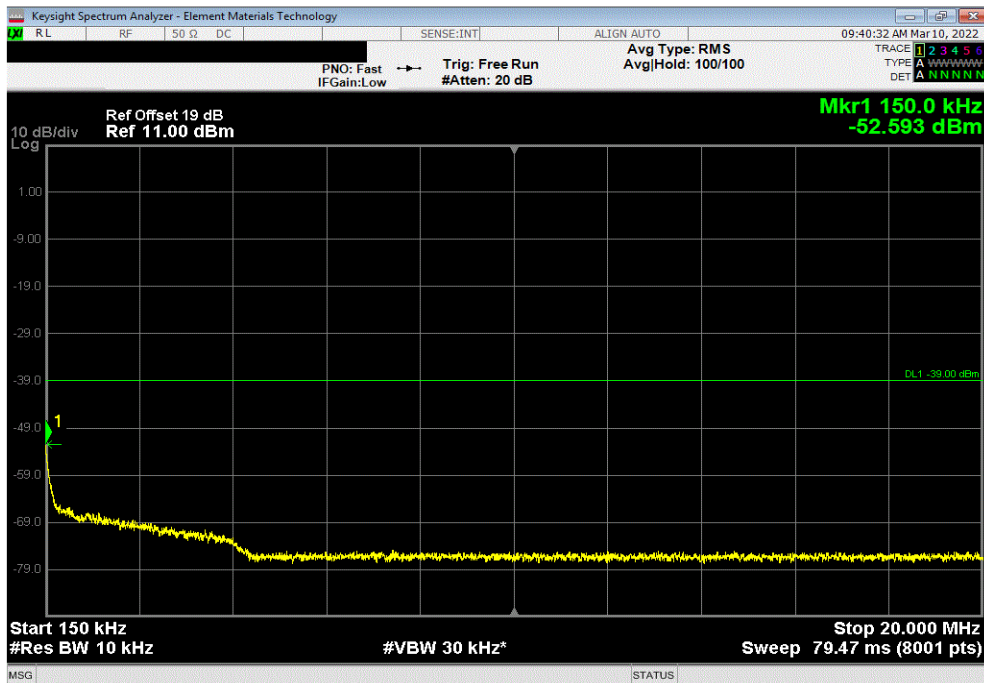


TbTx 2021.12.14.1 XMit 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 5 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz					
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result		
9 kHz - 150 kHz	-55.7	-49	Pass		



Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 5 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz					
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result		
150 kHz - 20 MHz	-52.6	-39	Pass		

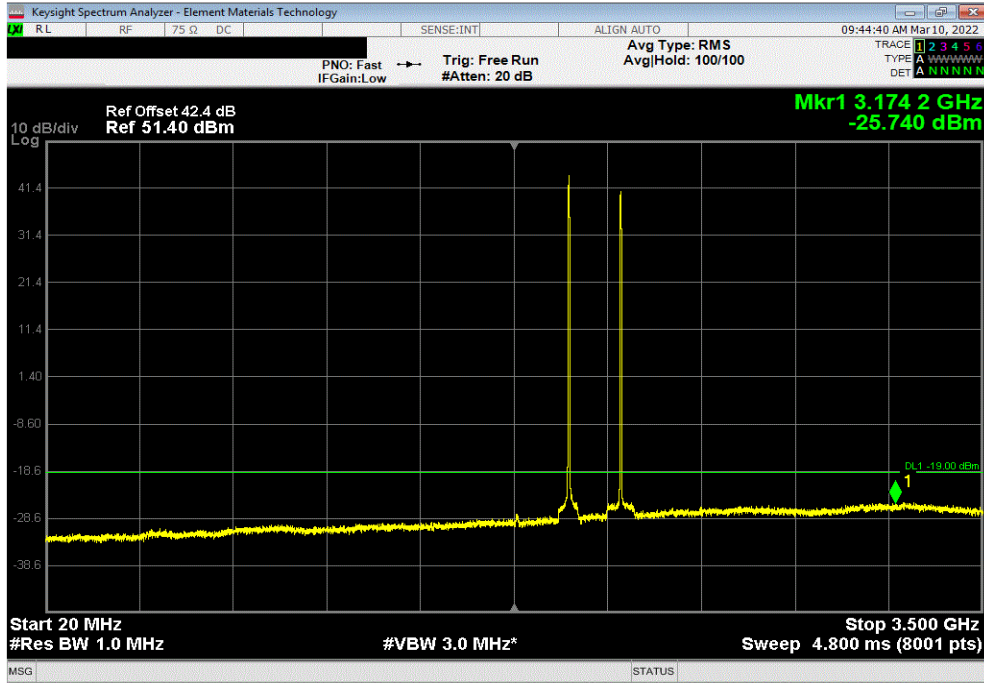


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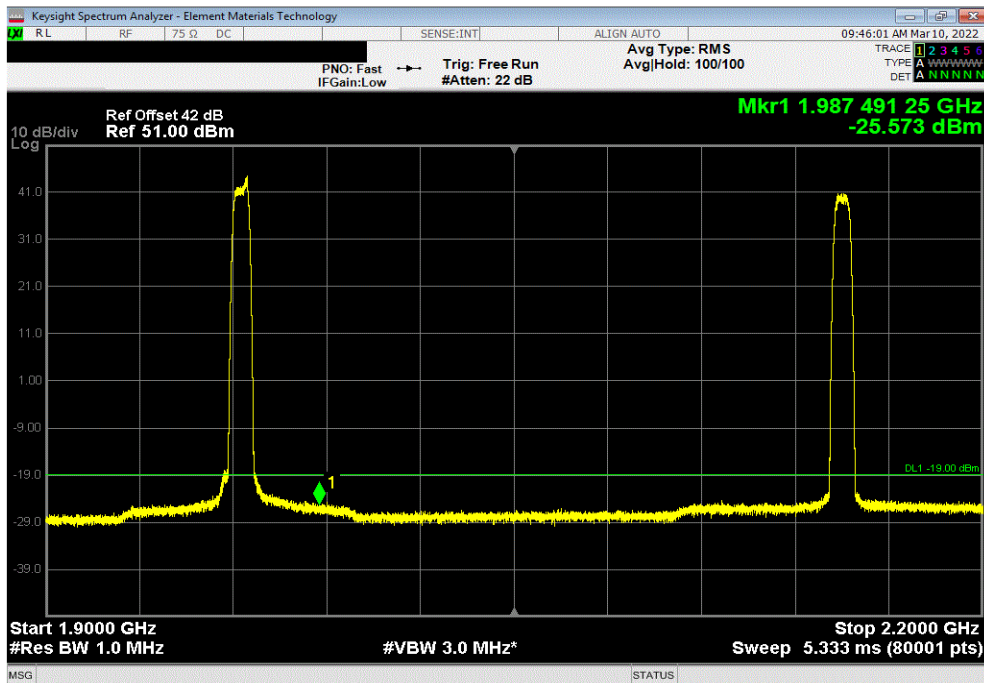


TbTx 2021.12.14.1 XMI 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 5 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
20 MHz - 3.5 GHz	-25.7	-30	Pass	



Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 5 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
1.9 GHz - 2.2 GHz	-25.6	-30	Pass	

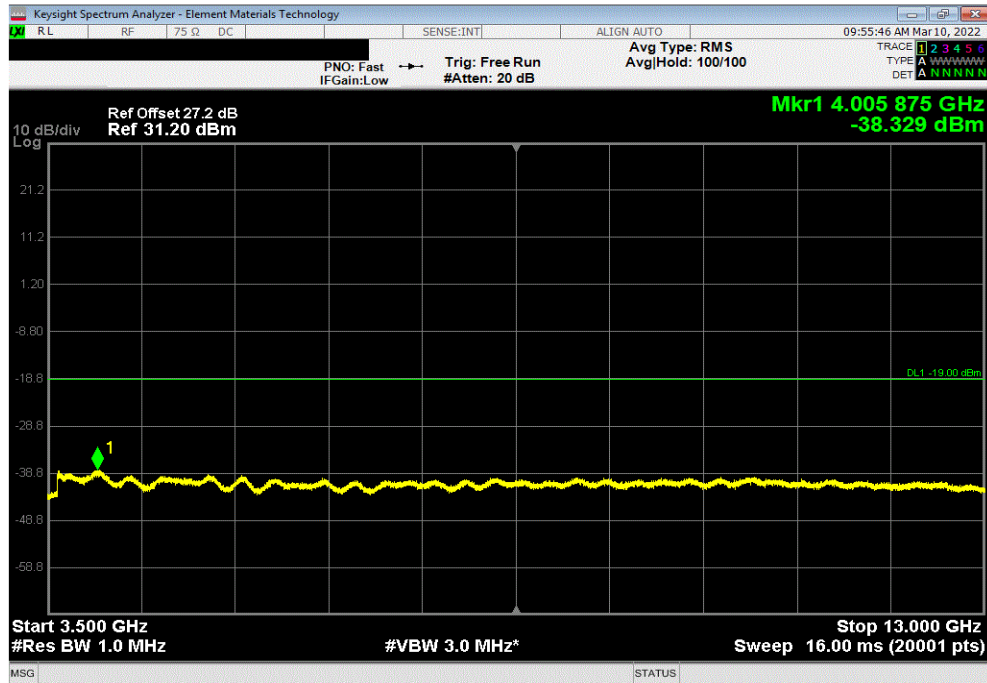


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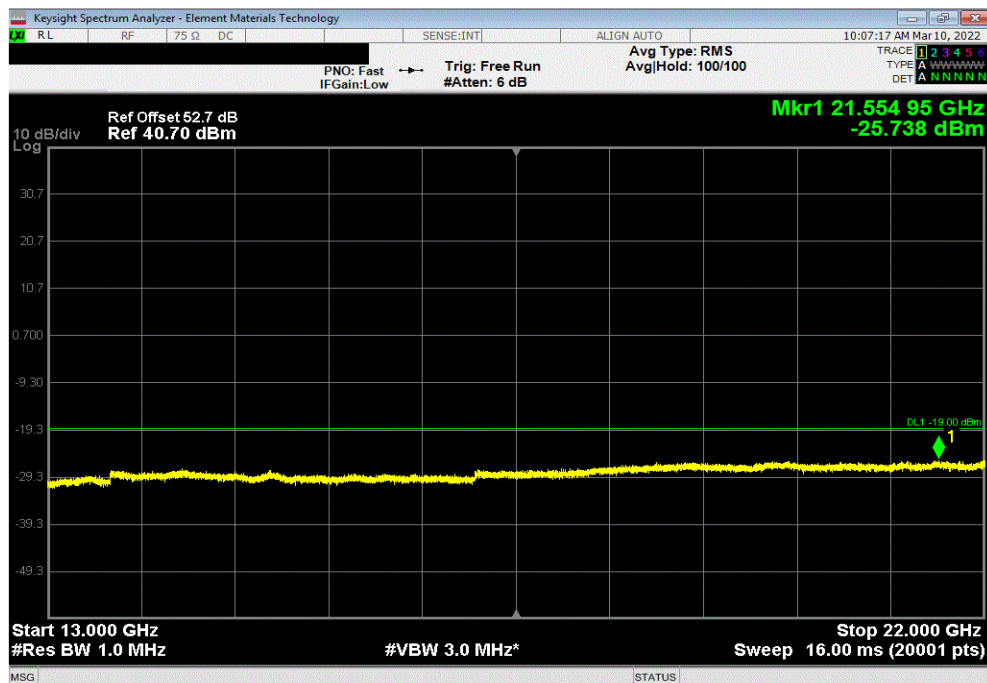


TbTtx 2021.12.14.1 XMit 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 5 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
3.5 GHz - 13 GHz	-38.3	-30	Pass	



Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 5 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
13 GHz - 22 GHz	-25.7	-30	Pass	

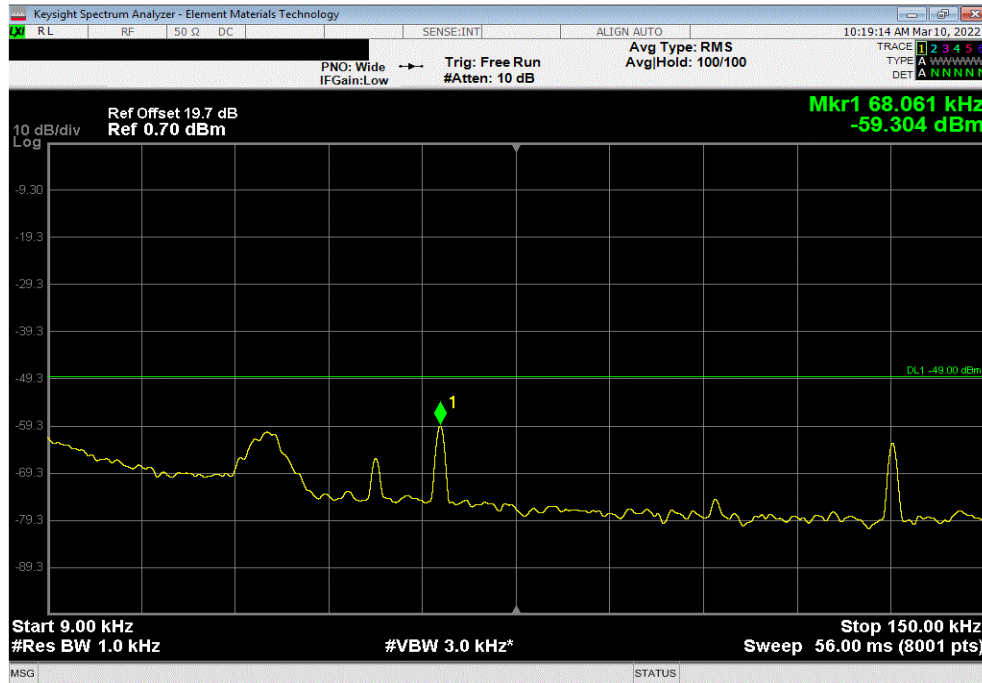


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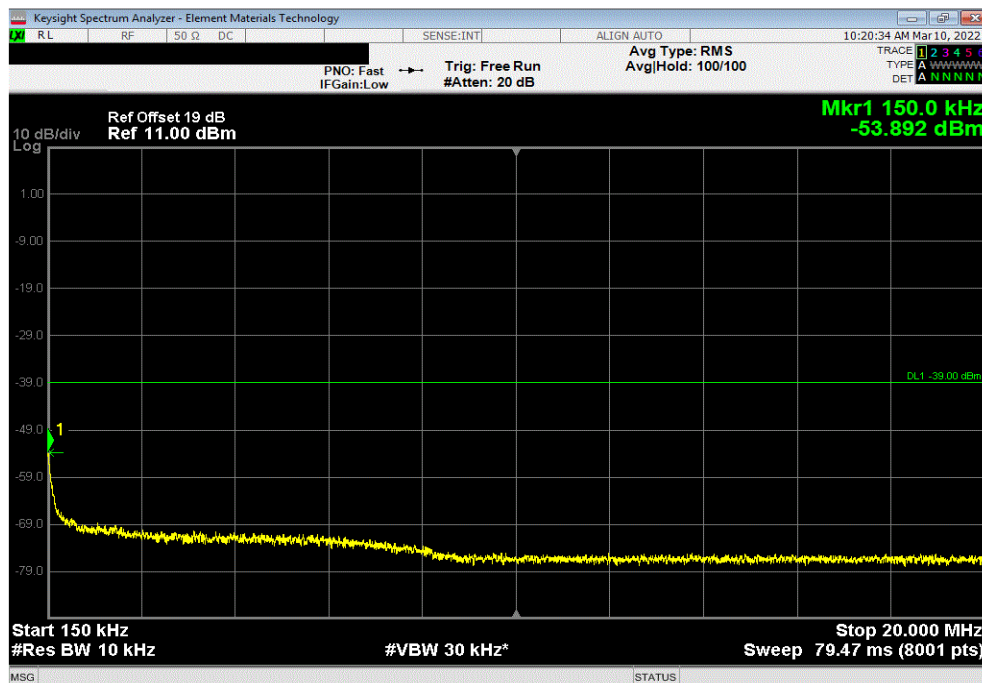


TbTx 2021.12.14.1 XMI 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 10 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz					
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result		
9 kHz - 150 kHz	-59.3	-49	Pass		



Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 10 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz					
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result		
150 kHz - 20 MHz	-53.9	-39	Pass		



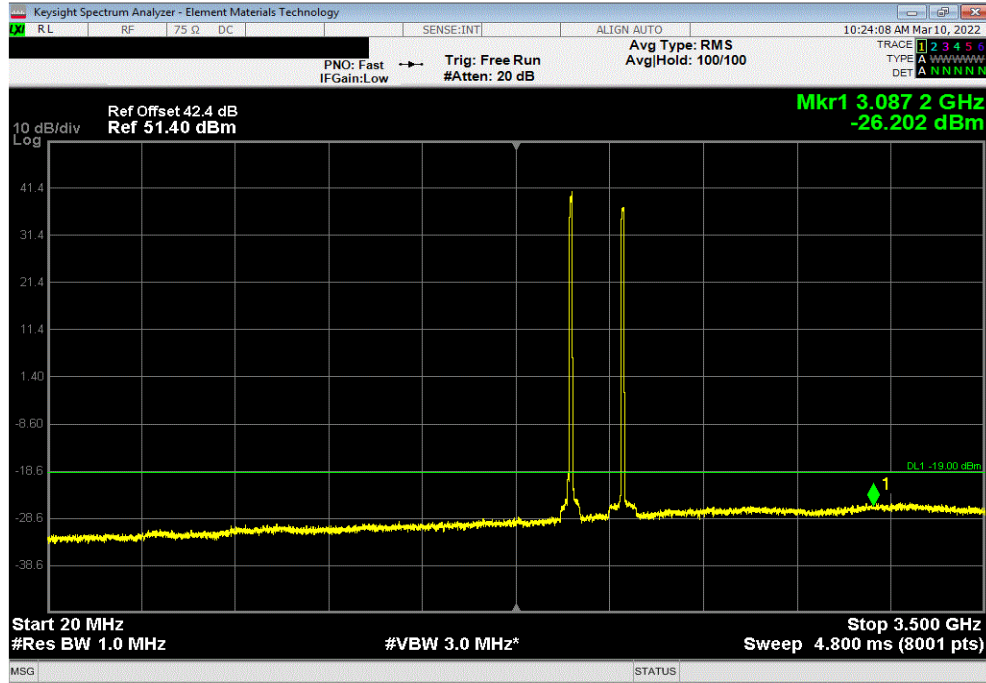


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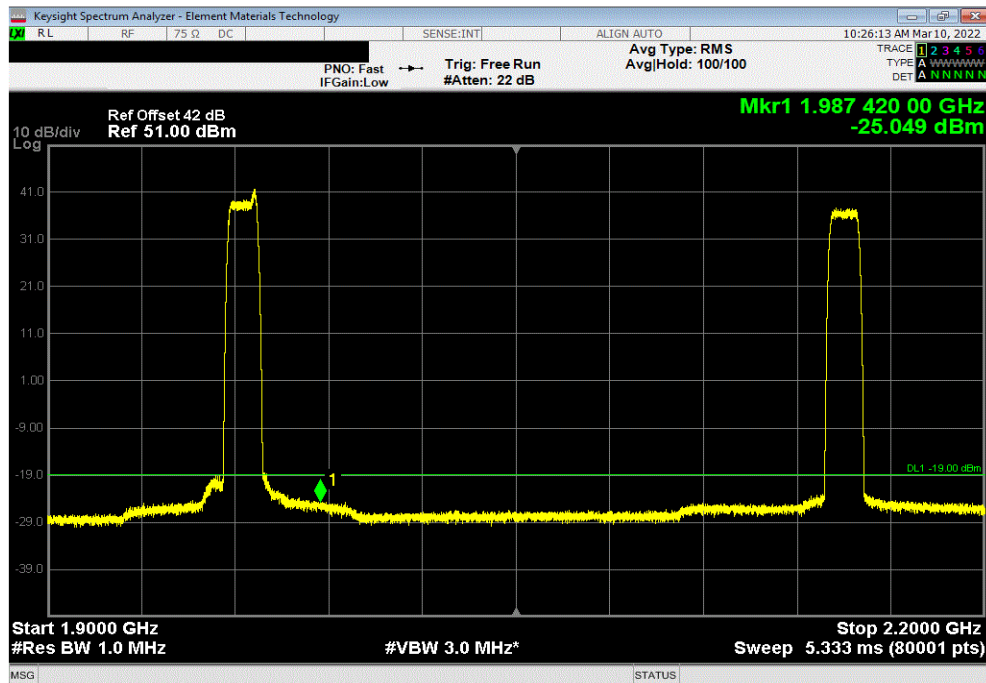


TbTx 2021.12.14.1 XMI 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 10 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
20 MHz - 3.5 GHz	-26.2	-30	Pass	



Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 10 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
1.9 GHz - 2.2 GHz	-25.1	-30	Pass	

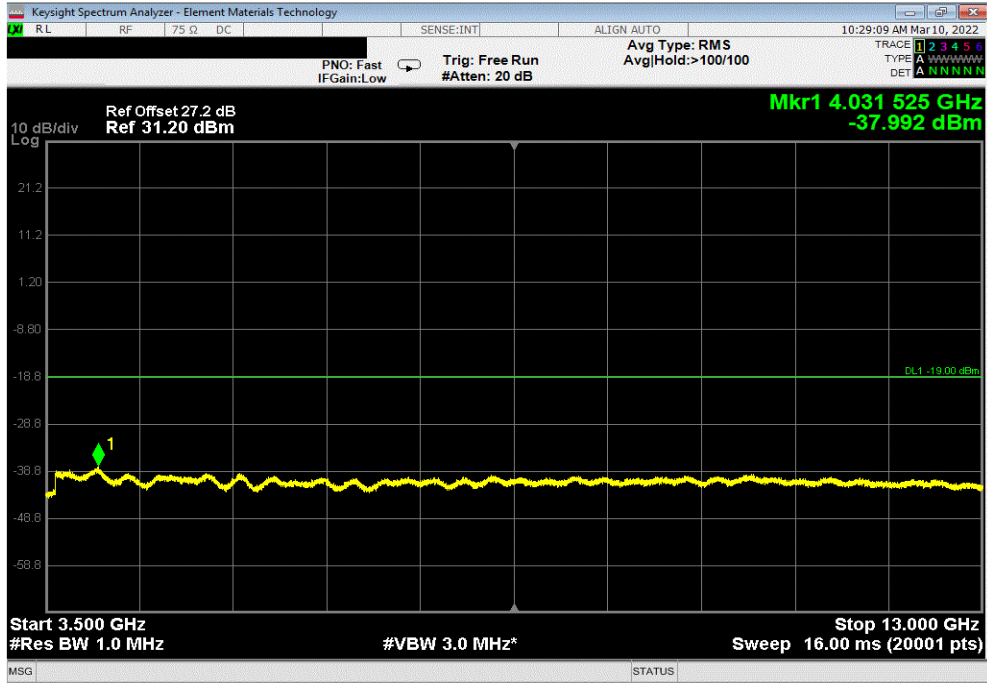


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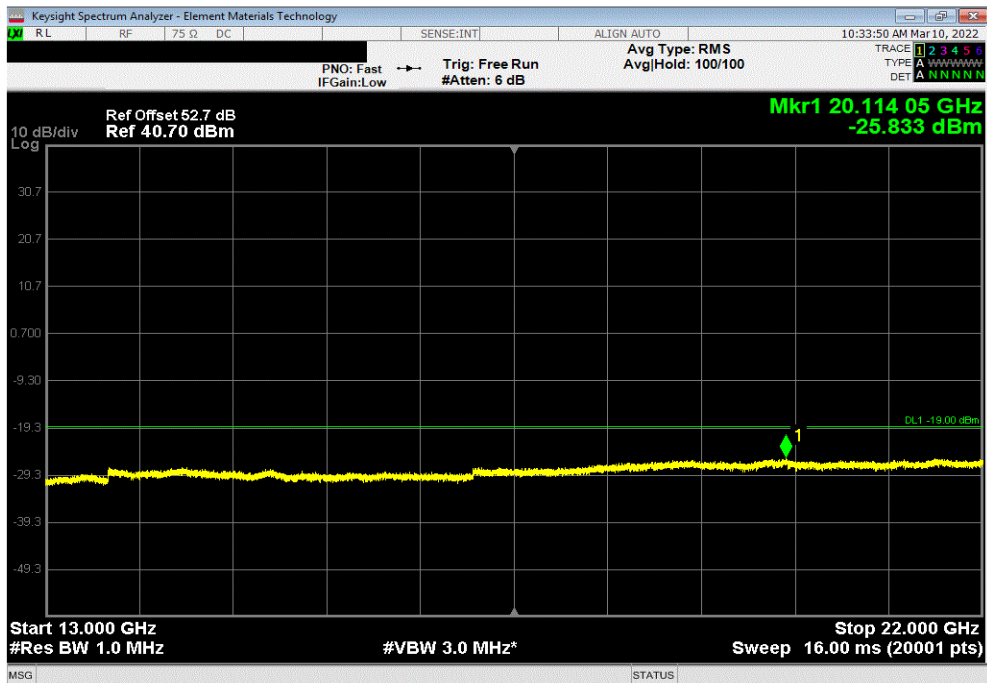


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Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 10 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
3.5 GHz - 13 GHz	-38.0	-30	Pass	



Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 10 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
13 GHz - 22 GHz	-25.8	-30	Pass	



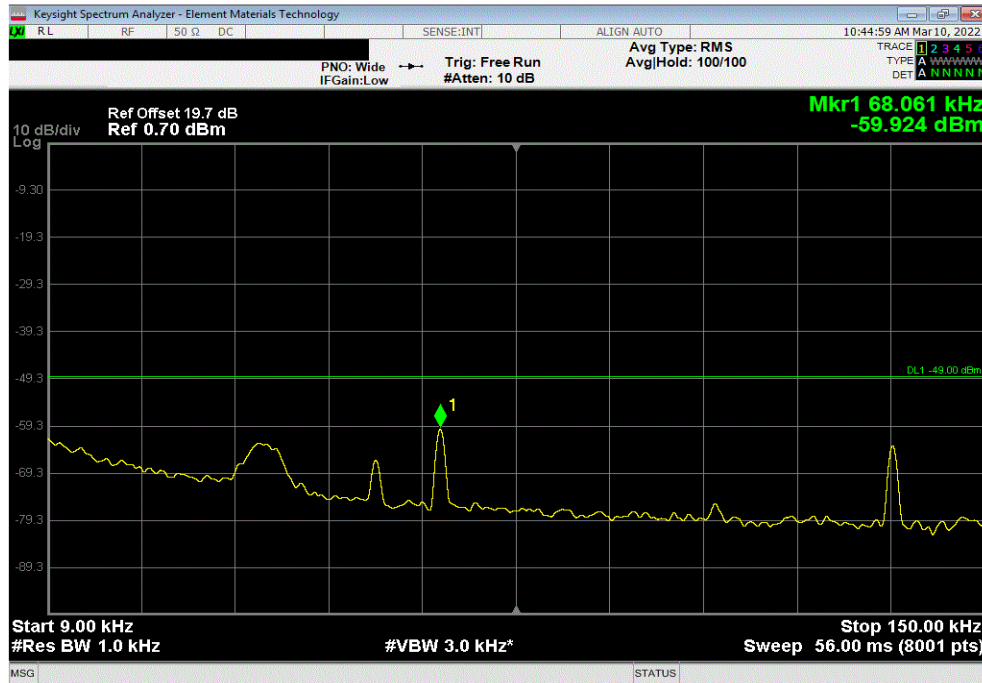


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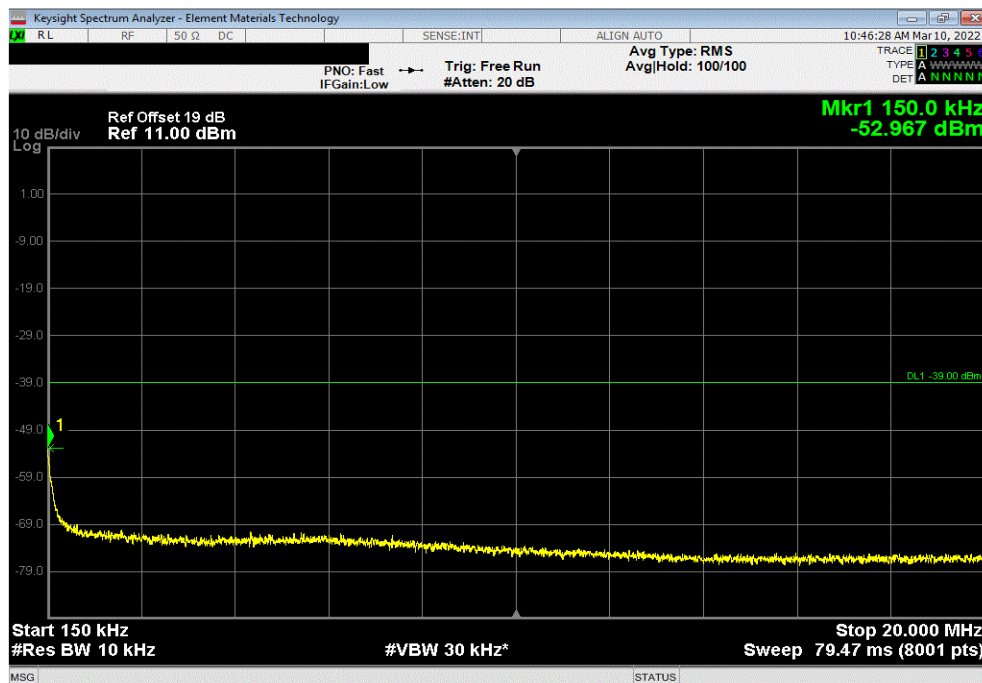


TbTx 2021.12.14.1 XMI 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 15 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz					
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result		
9 kHz - 150 kHz	-59.9	-49	Pass		



Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 15 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz					
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result		
150 kHz - 20 MHz	-53.0	-39	Pass		

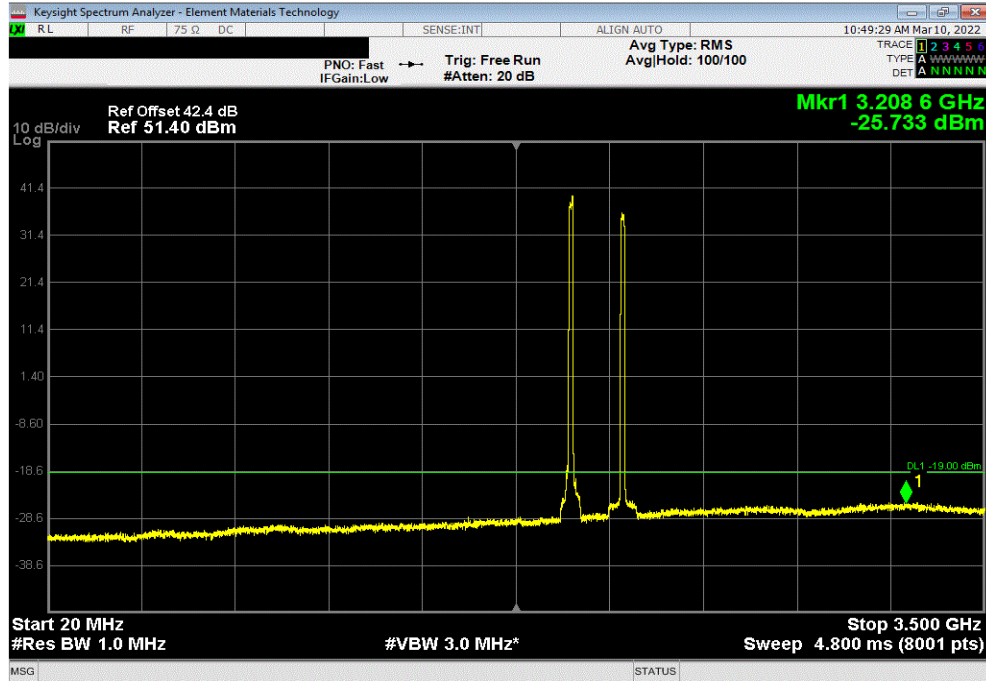


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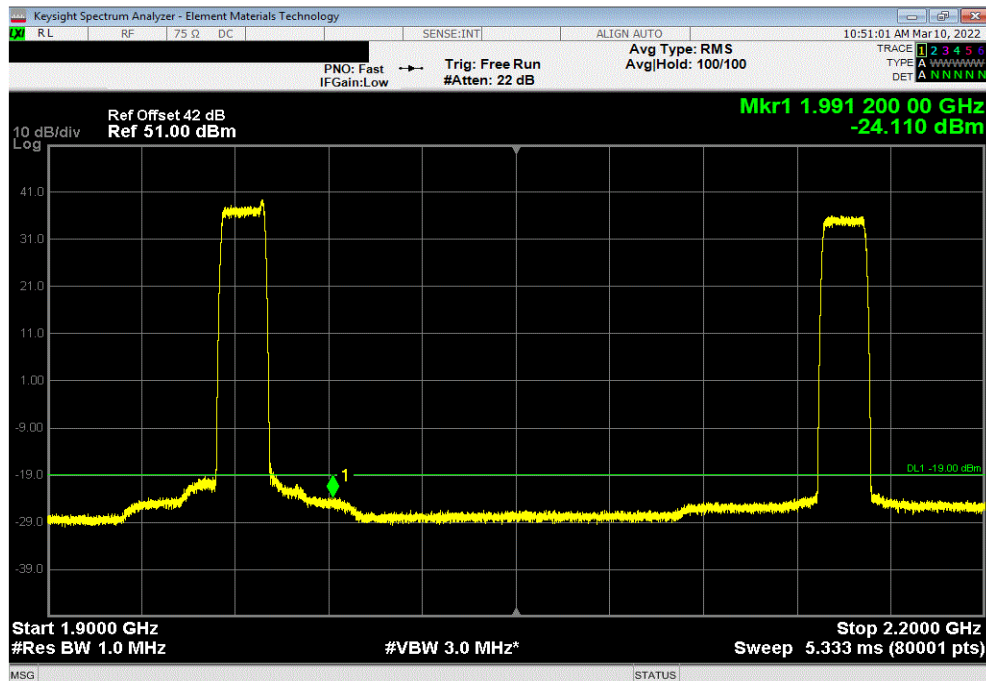


TbTx 2021.12.14.1 XMI 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 15 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
20 MHz - 3.5 GHz	-25.7	-30	Pass	



Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 15 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
1.9 GHz - 2.2 GHz	-24.1	-30	Pass	

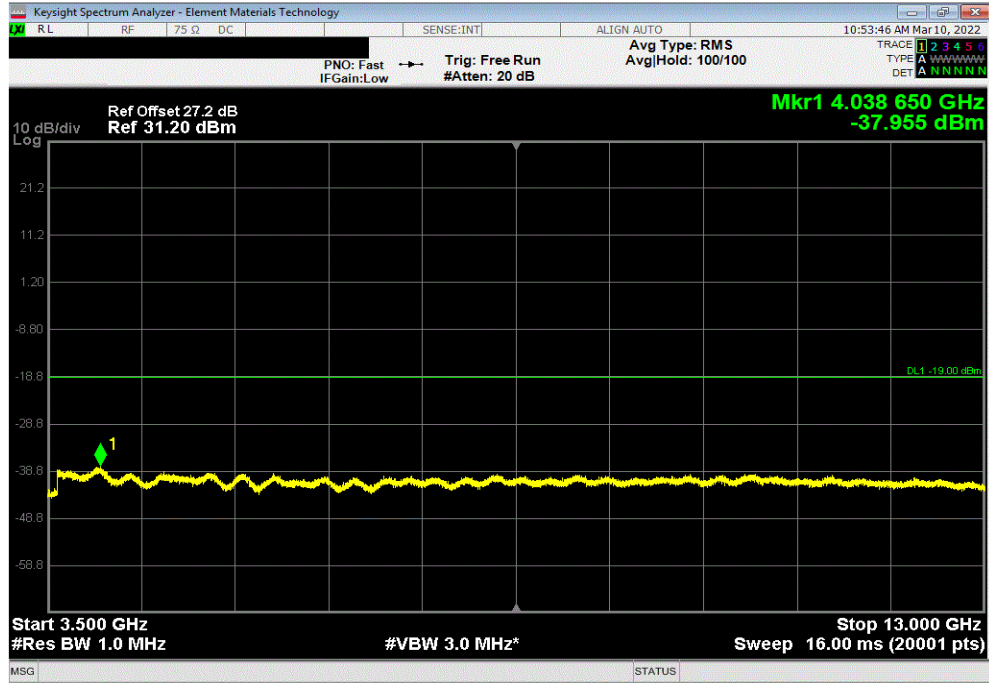


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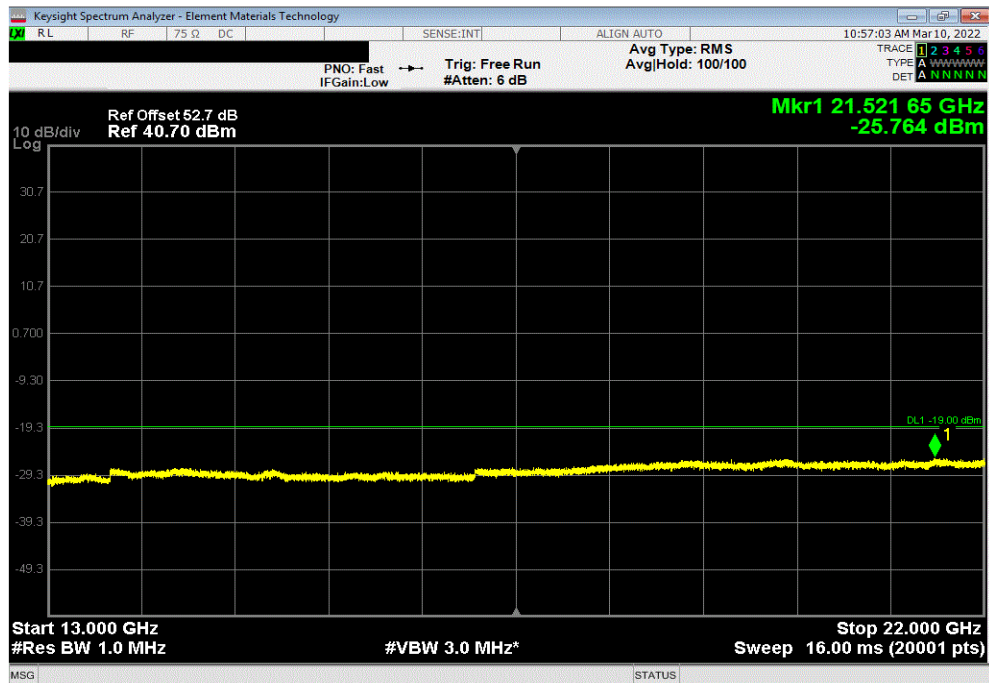


TbTx 2021.12.14.1 XMit 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 15 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
3.5 GHz - 13 GHz	-38.0	-30	Pass	



Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 15 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
13 GHz - 22 GHz	-25.8	-30	Pass	

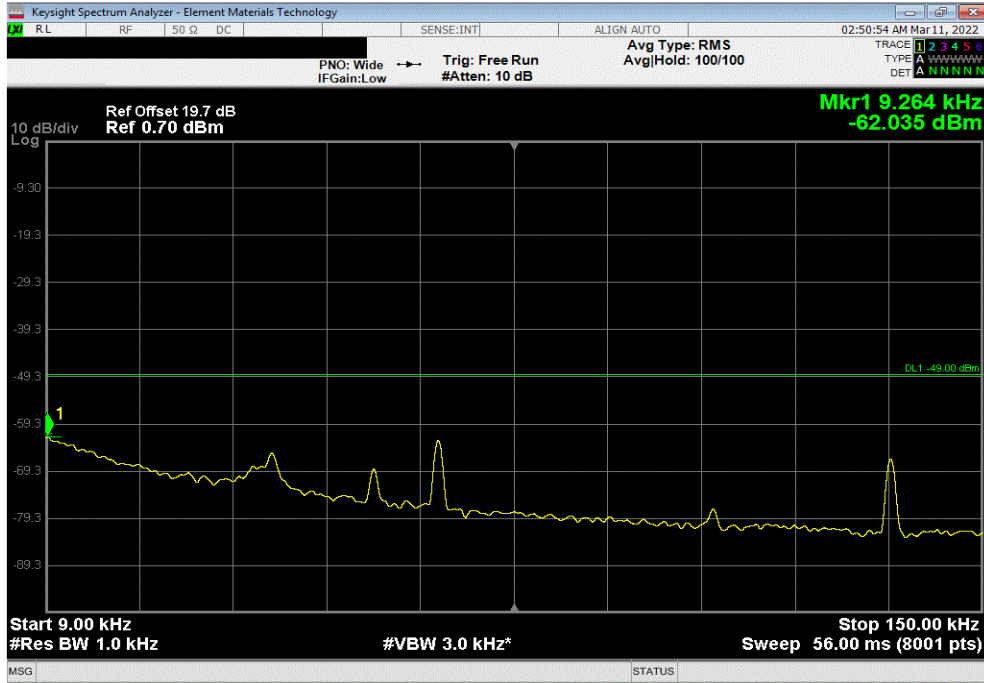


# SPURIOUS CONDUCTED EMISSIONS - IN-BAND

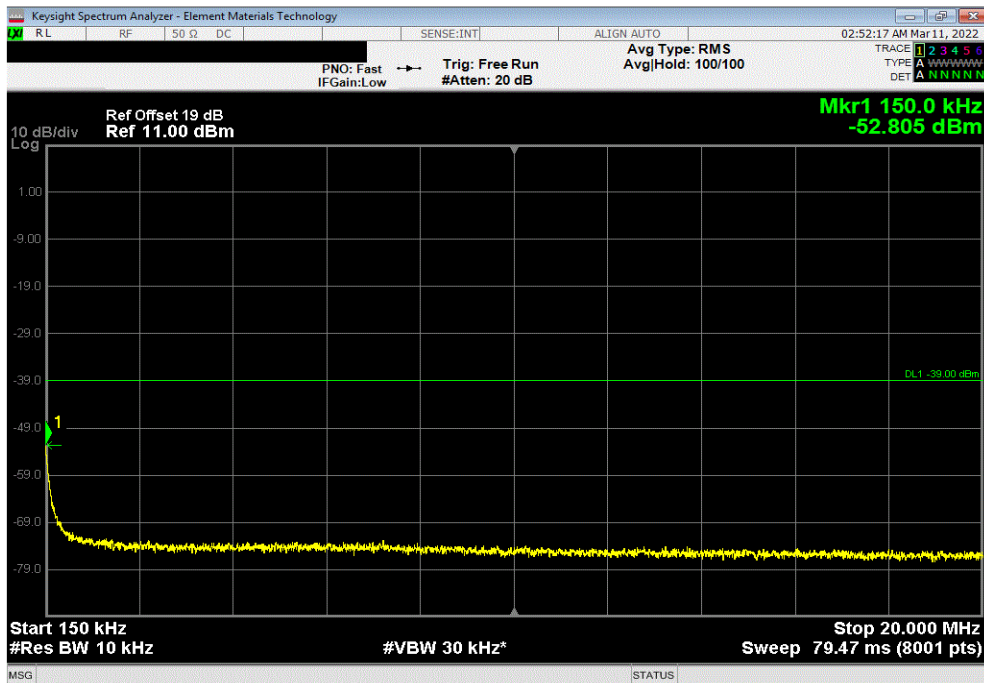


TbTx 2021.12.14.1 XMit 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 20 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz					
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result		
9 kHz - 150 kHz	-62.0	-49	Pass		



Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 20 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz					
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result		
150 kHz - 20 MHz	-52.8	-39	Pass		

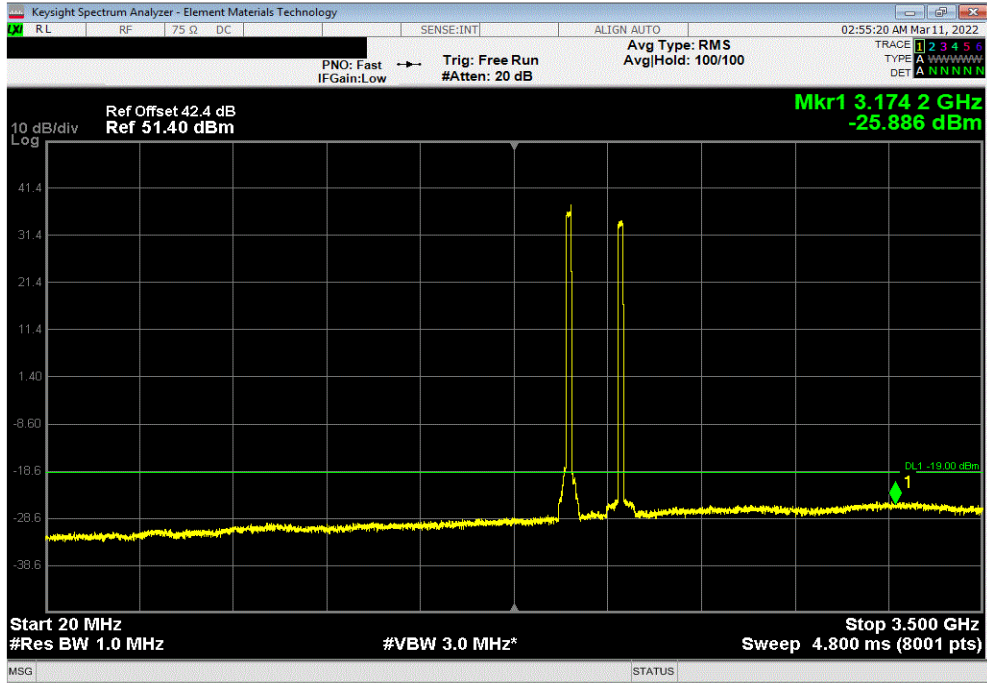


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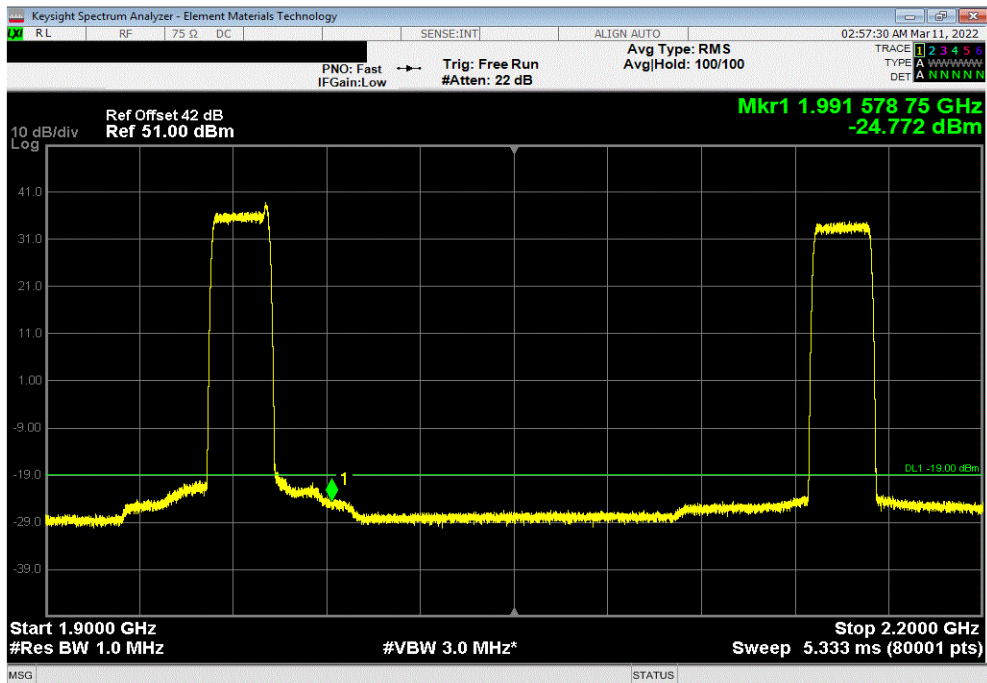


TbTx 2021.12.14.1 XMI 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 20 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
20 MHz - 3.5 GHz	-25.9	-30	Pass	



Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 20 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
1.9 GHz - 2.2 GHz	-24.8	-30	Pass	



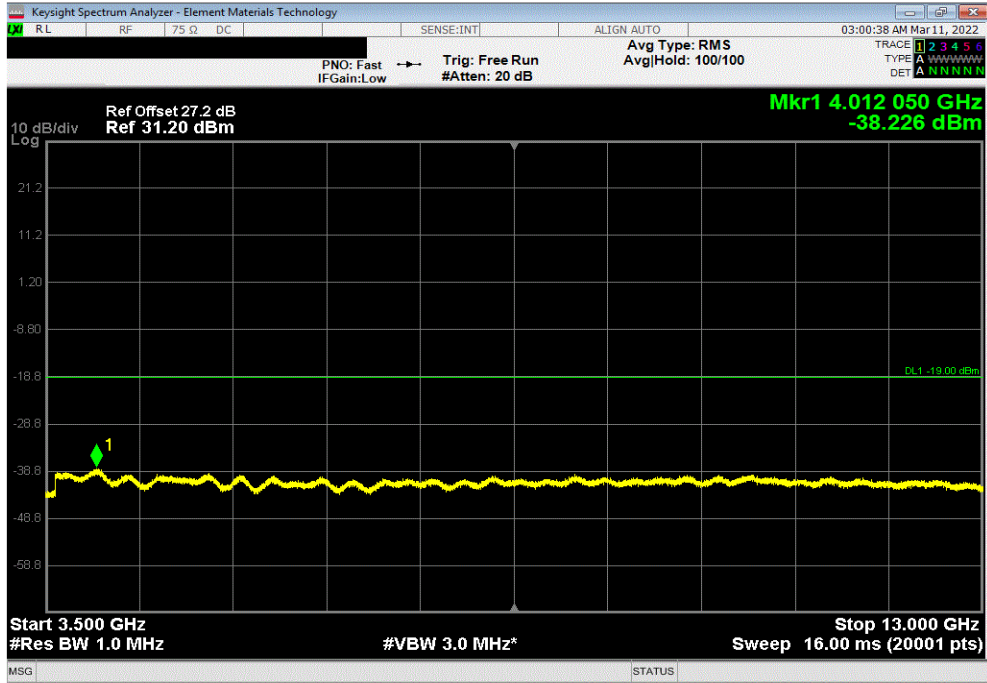


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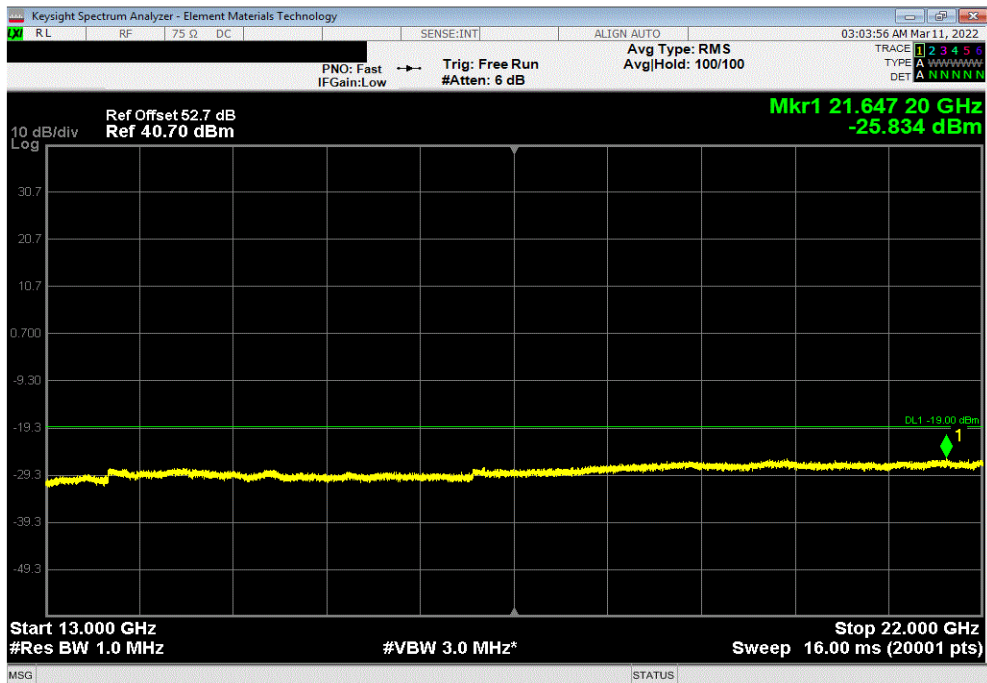


TbTx 2021.12.14.1 XMit 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 20 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
3.5 GHz - 13 GHz	-38.2	-30	Pass	



Band 25, 1930 MHz - 1995 MHz, LTE Inband, Port 1, 20 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 1962.5 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
13 GHz - 22 GHz	-25.8	-30	Pass	





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Tel: 2021.12.14.1 XMIT: 2022.02.07.0

EUT: AHFII Remote Radio Head		Work Order: NOKI0037	
Serial Number: YK214000036		Date: 18-Mar-22	
Customer: Nokia Solutions and Networks		Temperature: 24.7 °C	
Attendees: David Le, John Rattanavong		Humidity: 34.6% RH	
Project: None		Barometric Pres.: 0	
Tested by: Brandon Hobbs	Power: 54 VDC	Job Site: TX01	
<b>TEST SPECIFICATIONS</b>			
FCC 24E:2022		Test Method	
RSS-133 Issue 6: 2013+A1:2018		ANSI C63.26:2015	
FCC 27:2022		RSS-132 Issue 3:2013	
RSS-139 Issue 3:2015		ANSI C63.26:2015	
RSS-170 Issue 3:2015		RSS-139 Issue 3:2015	
RSS-170 Issue 3:2015		RSS-170 Issue 3:2015	
<b>COMMENTS</b>			
All measurement path losses accounted for in the reference level offset including any attenuators, filters, and DC blocks. Band 66 carriers enabled at maximum power is 80 watts/carrier. The Band 25 carrier was			
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			
Configuration #	1,2,3,4	Signature	
		Frequency Range	Max Value (dBm) Limit < (dBm) Result

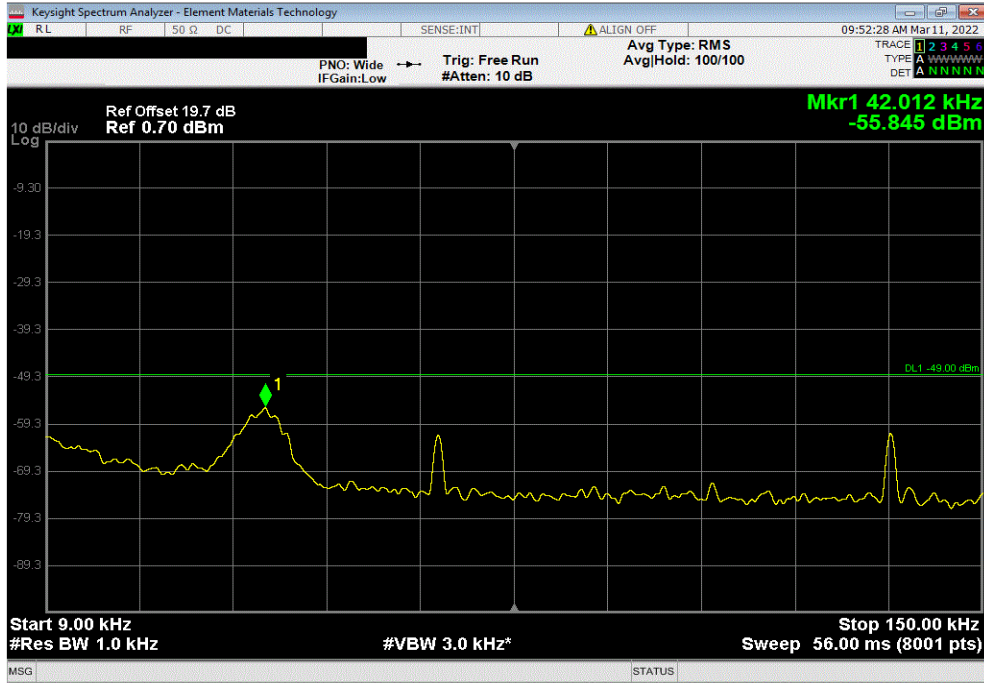
Configuration #	1,2,3,4	Signature	Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
Band 66, 2110 MHz - 2200 MHz, LTE InBand							
Port 1							
5 MHz Bandwidth							
E-TM 1.1 with N-TM Modulation							
			Mid Channel, 2155 MHz	9 kHz - 150 kHz	-55.9	-49	Pass
			Mid Channel, 2155 MHz	150 kHz - 20 MHz	-53.3	-39	Pass
			Mid Channel, 2155 MHz	20 MHz - 3.5 GHz	-26.2	-30	Pass
			Mid Channel, 2155 MHz	1.9 GHz - 2.2 GHz	-25.4	-30	Pass
			Mid Channel, 2155 MHz	3.5 GHz - 13 GHz	-38.0	-30	Pass
			Mid Channel, 2155 MHz	13 GHz - 22 GHz	-25.8	-30	Pass
10 MHz Bandwidth							
E-TM 1.1 with N-TM Modulation							
			Mid Channel, 2155 MHz	9 kHz - 150 kHz	-60.8	-49	Pass
			Mid Channel, 2155 MHz	150 kHz - 20 MHz	-53.3	-39	Pass
			Mid Channel, 2155 MHz	20 MHz - 3.5 GHz	-25.7	-30	Pass
			Mid Channel, 2155 MHz	1.9 GHz - 2.2 GHz	-24.2	-30	Pass
			Mid Channel, 2155 MHz	3.5 GHz - 13 GHz	-38.0	-30	Pass
			Mid Channel, 2155 MHz	13 GHz - 22 GHz	-26.0	-30	Pass
15 MHz Bandwidth							
E-TM 1.1 with N-TM Modulation							
			Mid Channel, 2155 MHz	9 kHz - 150 kHz	-62.0	-49	Pass
			Mid Channel, 2155 MHz	150 kHz - 20 MHz	-53.9	-39	Pass
			Mid Channel, 2155 MHz	20 MHz - 3.5 GHz	-25.7	-30	Pass
			Mid Channel, 2155 MHz	1.9 GHz - 2.2 GHz	-24.2	-30	Pass
			Mid Channel, 2155 MHz	3.5 GHz - 13 GHz	-38.1	-30	Pass
			Mid Channel, 2155 MHz	13 GHz - 22 GHz	-25.7	-30	Pass
20 MHz Bandwidth							
E-TM 1.1 with N-TM Modulation							
			Mid Channel, 2155 MHz	9 kHz - 150 kHz	-59.9	-49	Pass
			Mid Channel, 2155 MHz	150 kHz - 20 MHz	-53.6	-39	Pass
			Mid Channel, 2155 MHz	20 MHz - 3.5 GHz	-25.8	-30	Pass
			Mid Channel, 2155 MHz	1.9 GHz - 2.2 GHz	-24.7	-30	Pass
			Mid Channel, 2155 MHz	3.5 GHz - 13 GHz	-38.0	-30	Pass
			Mid Channel, 2155 MHz	13 GHz - 22 GHz	-25.9	-30	Pass

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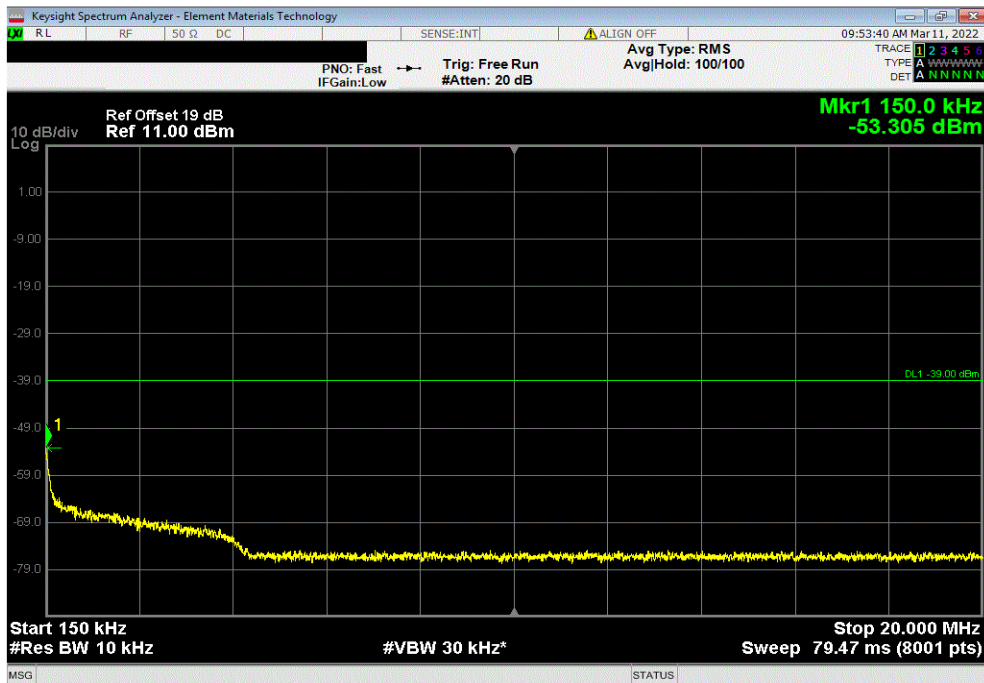


TbTx 2021.12.14.1 XMI 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 5 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz					
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result		
9 kHz - 150 kHz	-55.9	-49	Pass		



Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 5 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz					
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result		
150 kHz - 20 MHz	-53.3	-39	Pass		

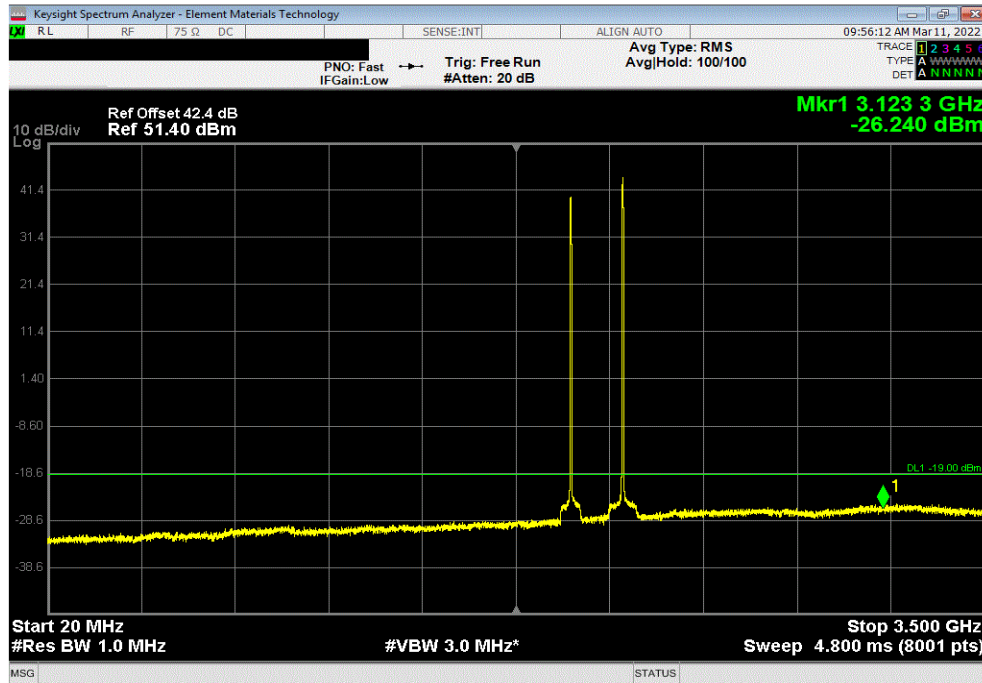


# SPURIOUS CONDUCTED EMISSIONS - IN-BAND

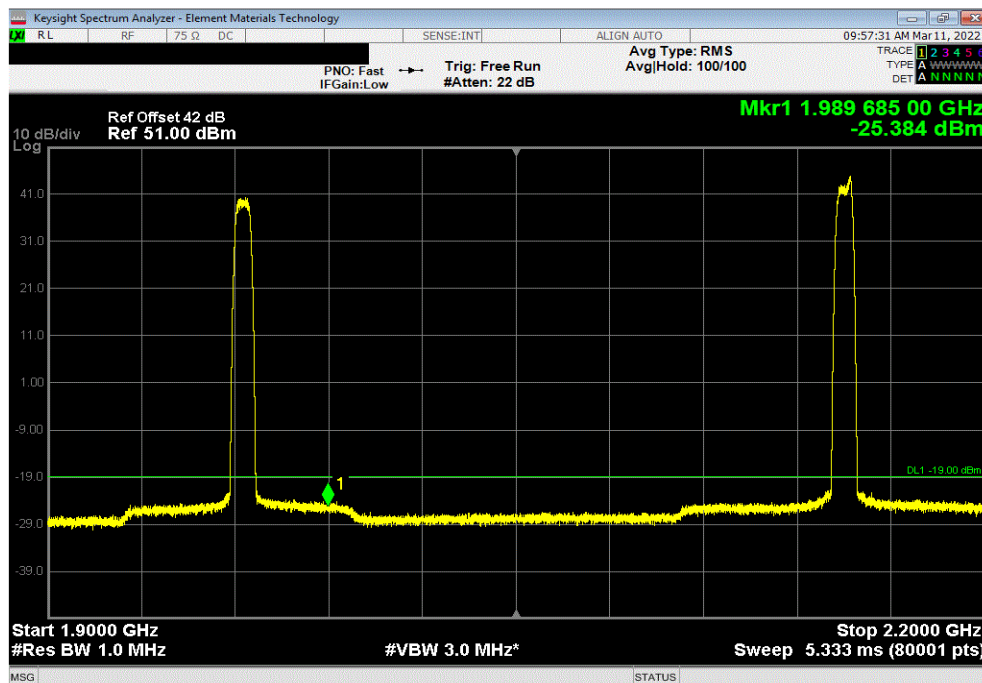


TbTx 2021.12.14.1 XMit 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 5 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
20 MHz - 3.5 GHz	-26.2	-30	Pass	



Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 5 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
1.9 GHz - 2.2 GHz	-25.4	-30	Pass	

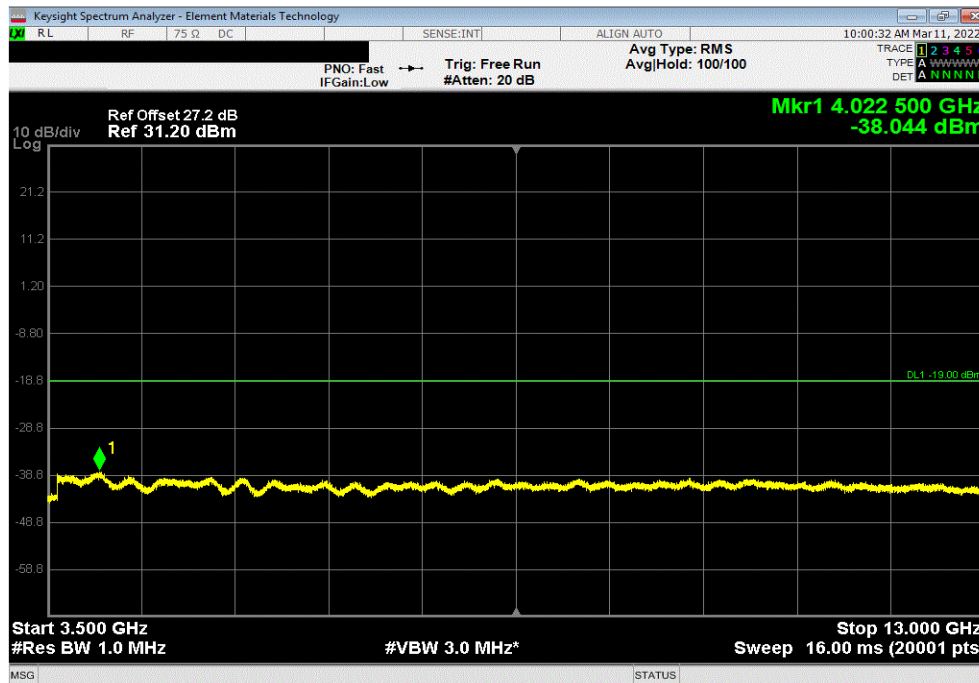


# SPURIOUS CONDUCTED EMISSIONS - IN-BAND

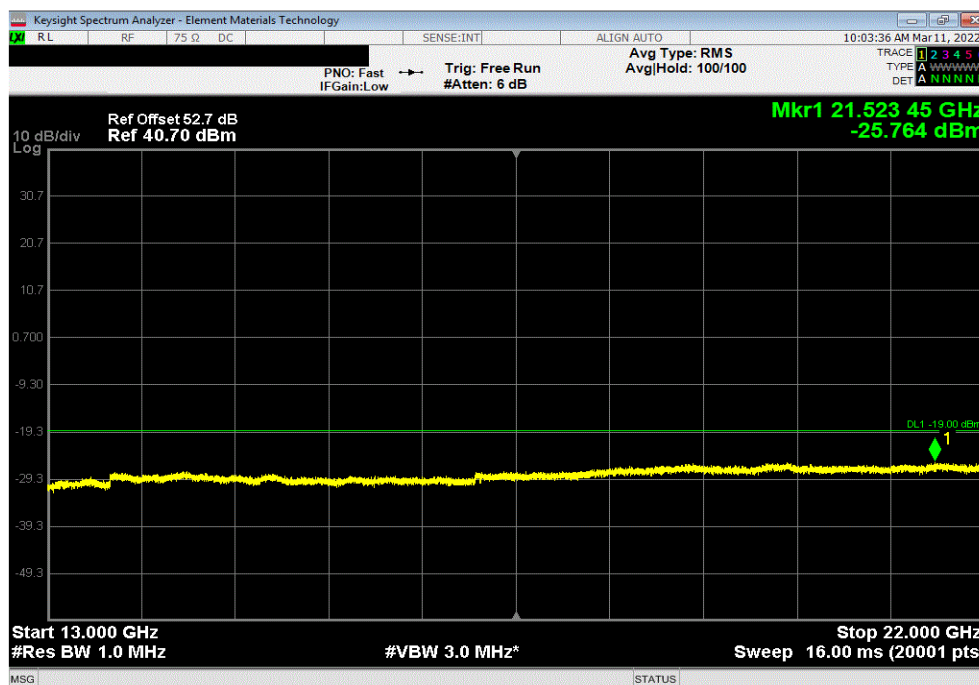


TbTtx 2021.12.14.1 XMit 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 5 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
3.5 GHz - 13 GHz	-38.0	-30	Pass	



Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 5 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
13 GHz - 22 GHz	-25.8	-30	Pass	

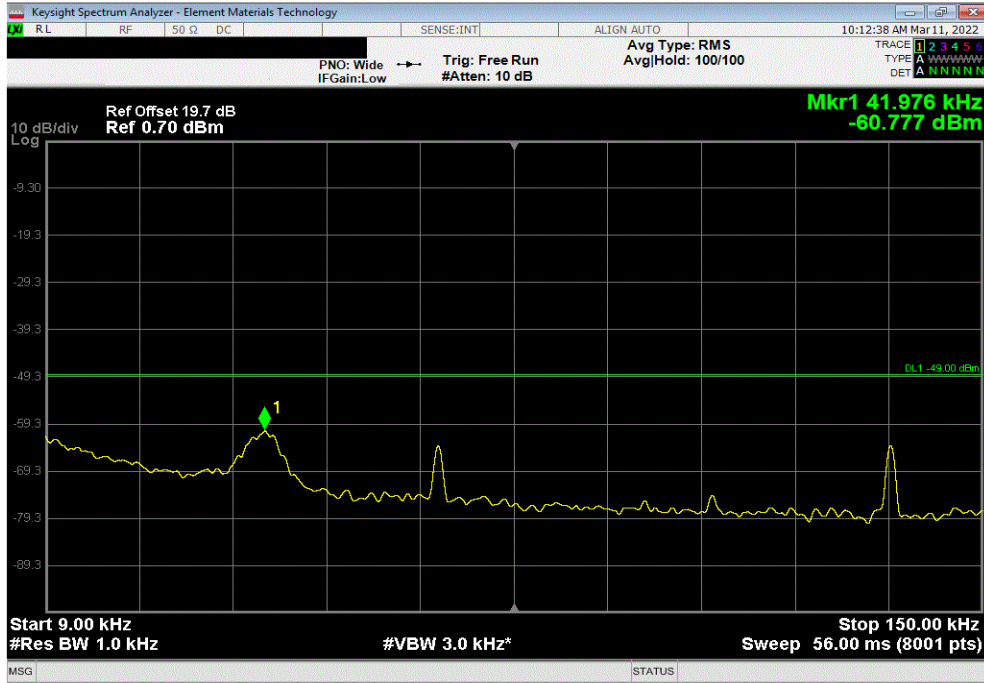


# SPURIOUS CONDUCTED EMISSIONS - IN-BAND

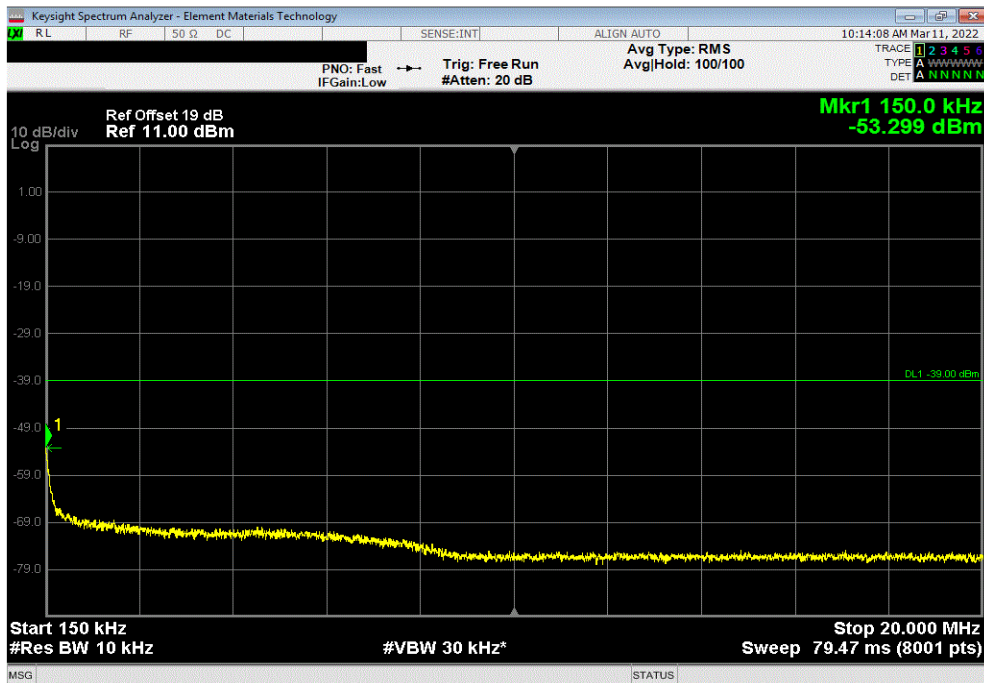


TbTx 2021.12.14.1 XMit 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 10 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz					
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result		
9 kHz - 150 kHz	-60.8	-49	Pass		



Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 10 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz					
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result		
150 kHz - 20 MHz	-53.3	-39	Pass		



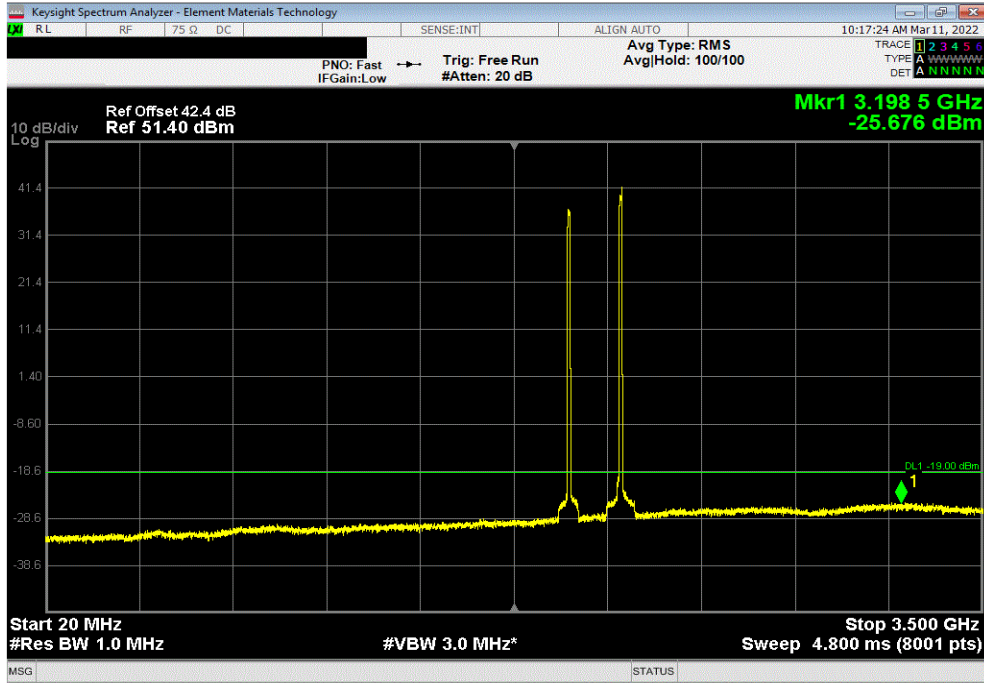


# SPURIOUS CONDUCTED EMISSIONS - IN-BAND

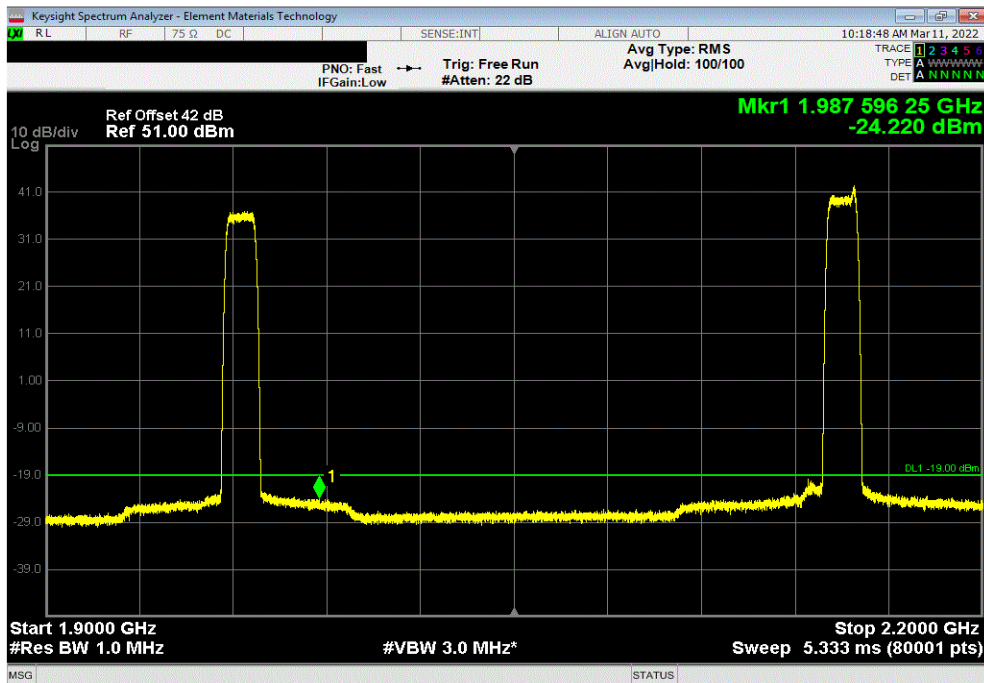


TbTx 2021.12.14.1 XMit 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 10 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
20 MHz - 3.5 GHz	-25.7	-30	Pass	



Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 10 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
1.9 GHz - 2.2 GHz	-24.2	-30	Pass	



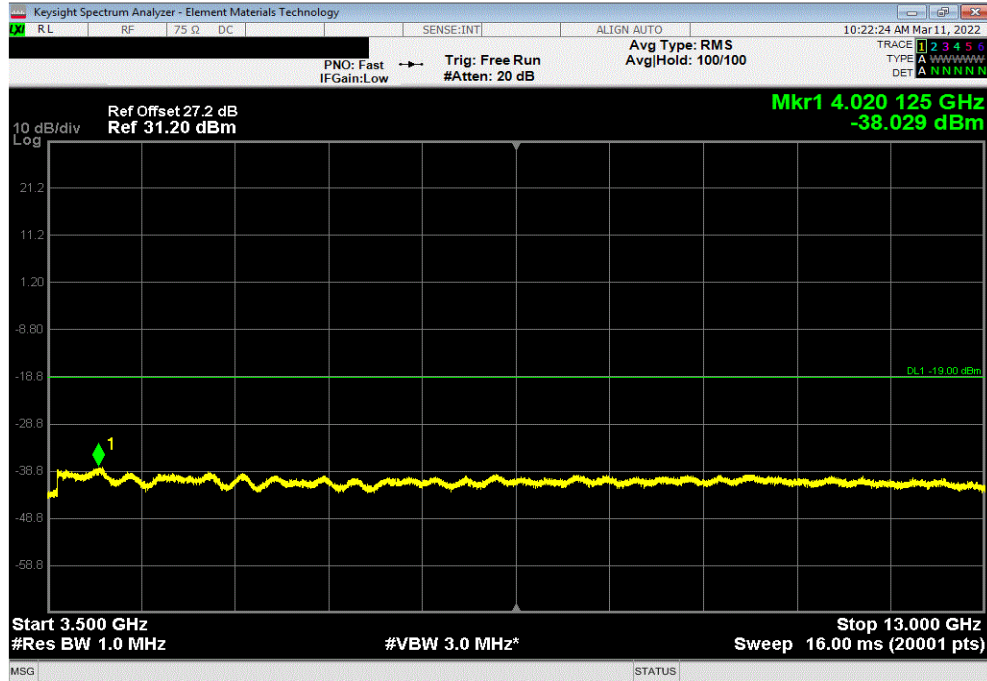


# SPURIOUS CONDUCTED EMISSIONS - IN-BAND

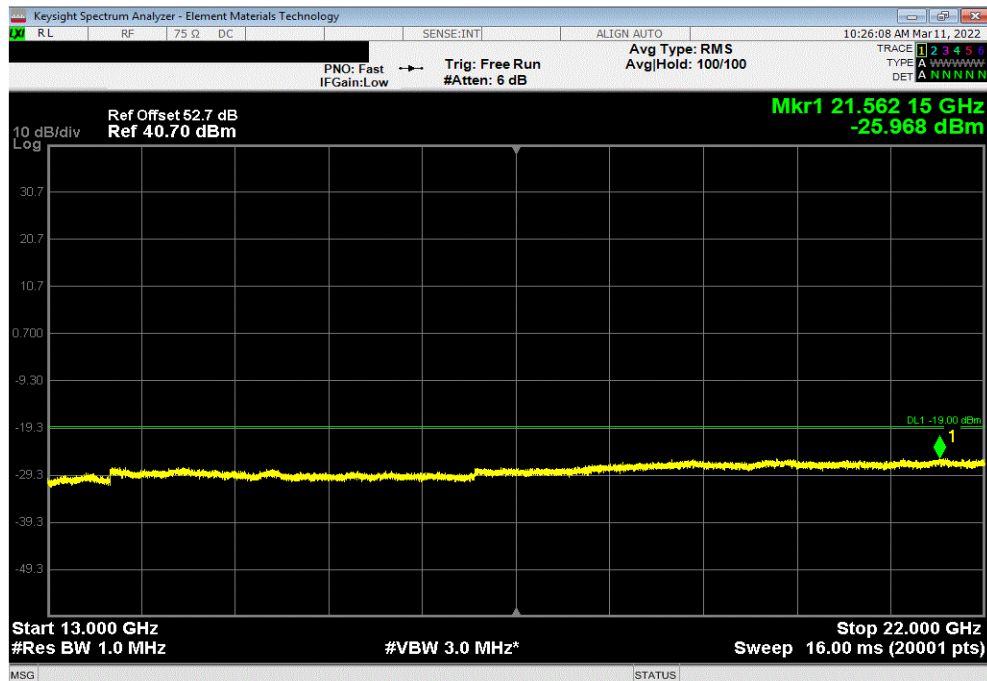


TbTx 2021.12.14.1 XMit 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 10 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
3.5 GHz - 13 GHz	-38.0	-30	Pass	



Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 10 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
13 GHz - 22 GHz	-26.0	-30	Pass	

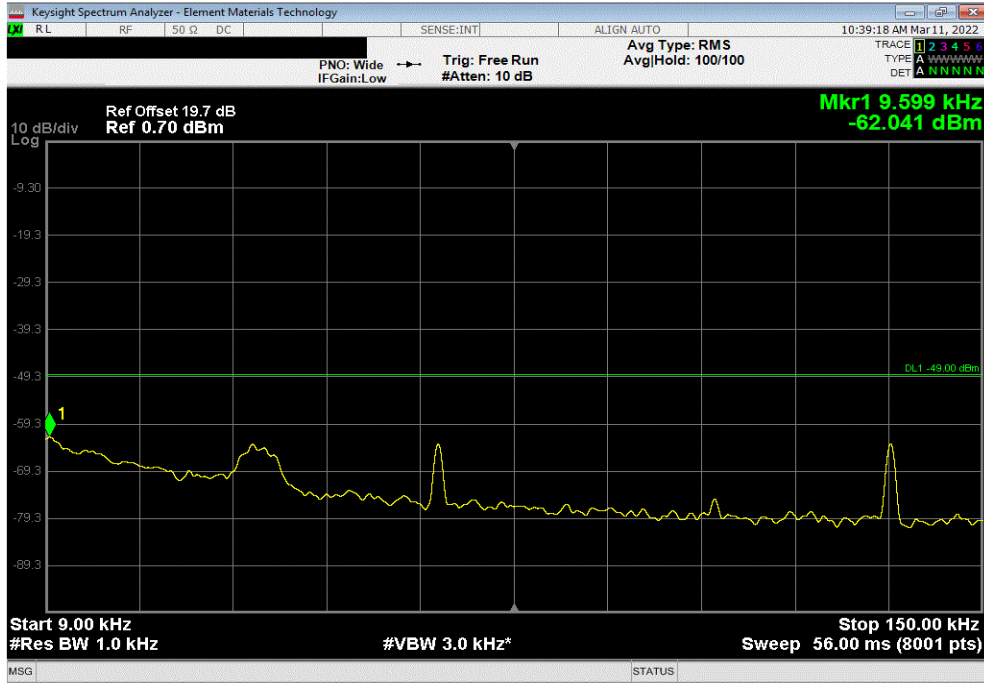


# SPURIOUS CONDUCTED EMISSIONS - IN-BAND

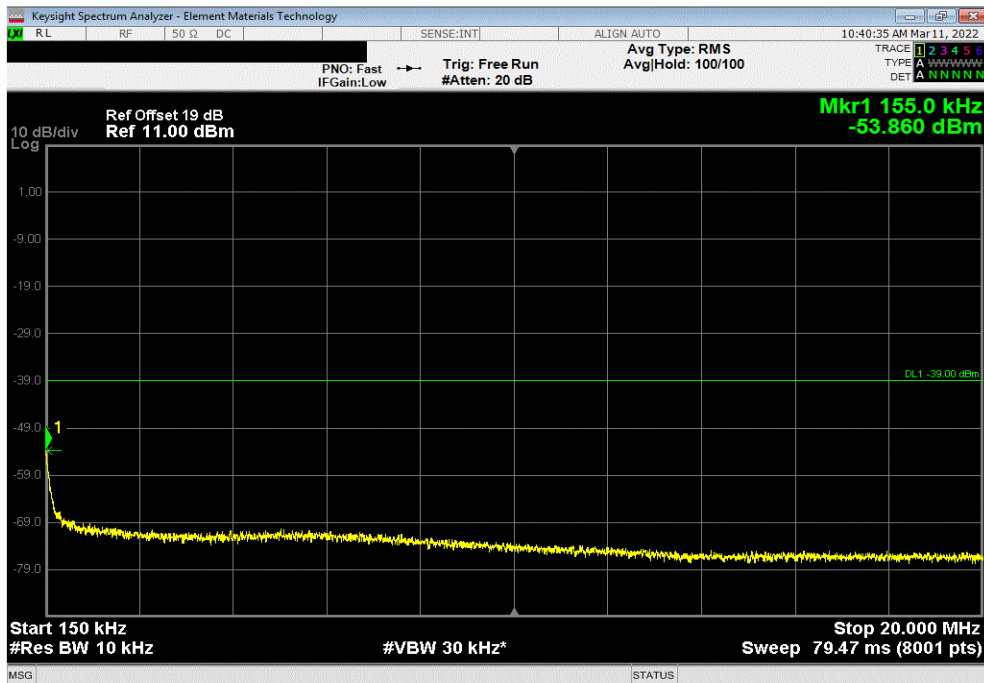


TbTx 2021.12.14.1 XMit 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 15 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz					
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result		
9 kHz - 150 kHz	-62.0	-49	Pass		



Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 15 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz					
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result		
150 kHz - 20 MHz	-53.9	-39	Pass		

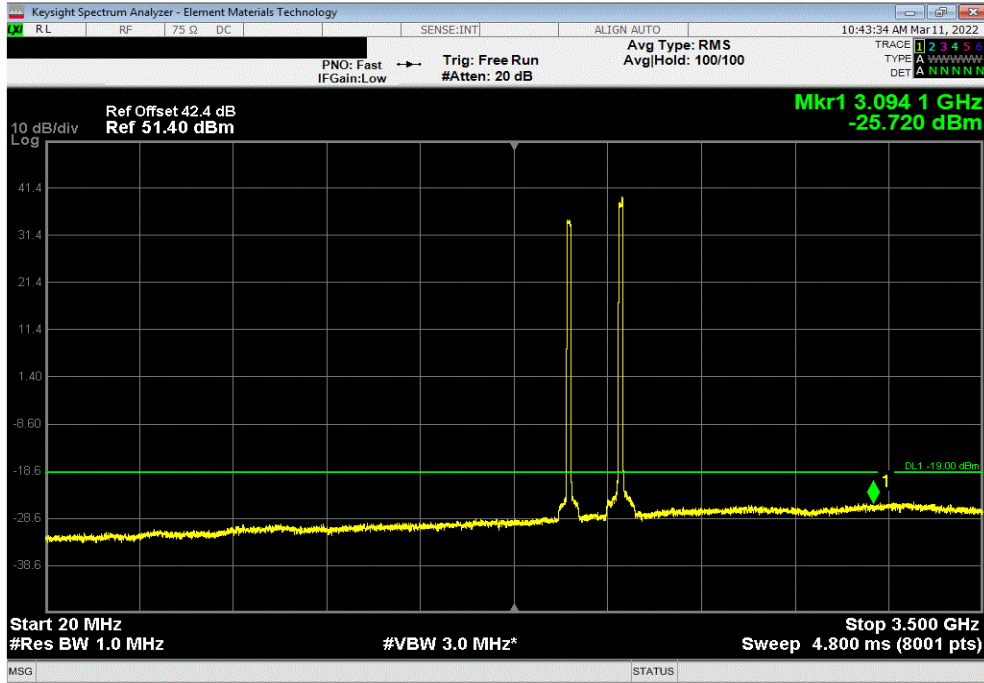


# SPURIOUS CONDUCTED EMISSIONS - IN-BAND

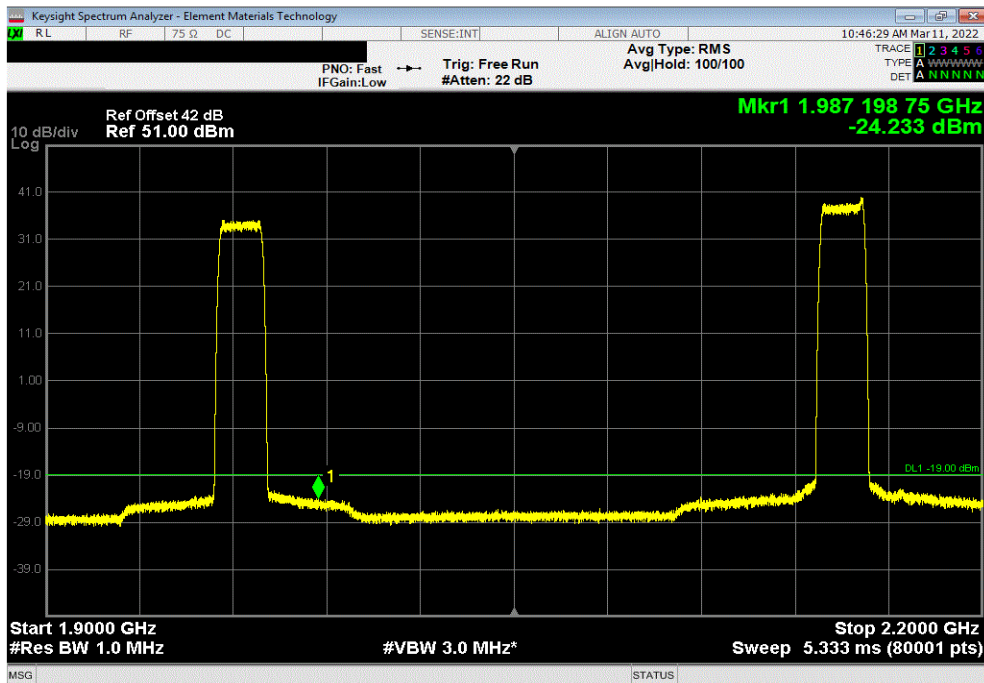


TbTx 2021.12.14.1 XMI 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 15 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
20 MHz - 3.5 GHz	-25.7	-30	Pass	



Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 15 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
1.9 GHz - 2.2 GHz	-24.2	-30	Pass	

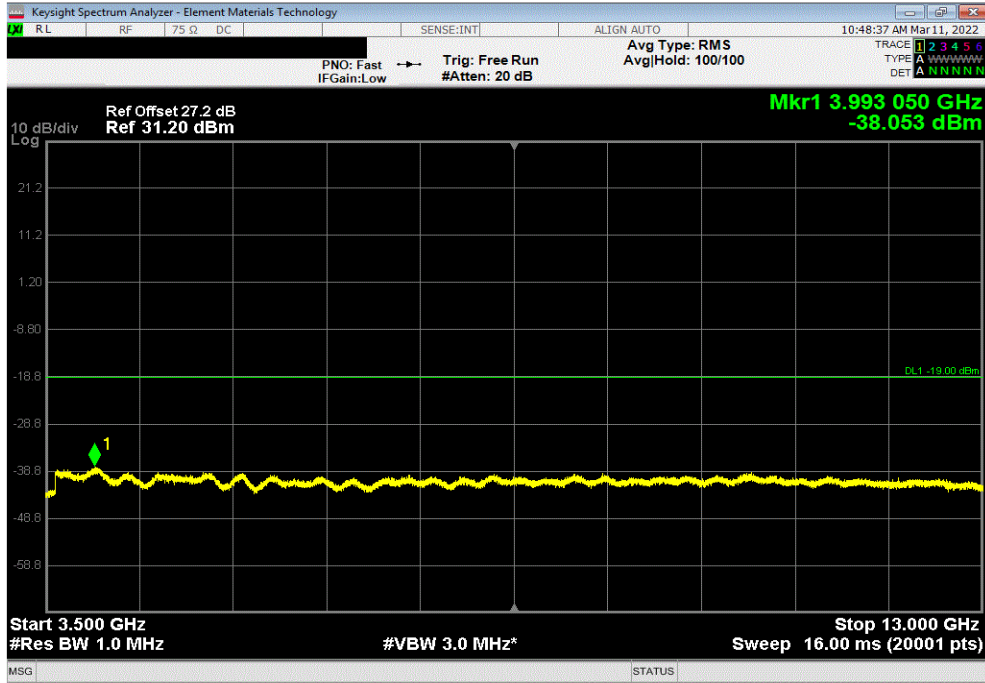


# SPURIOUS CONDUCTED EMISSIONS - IN-BAND

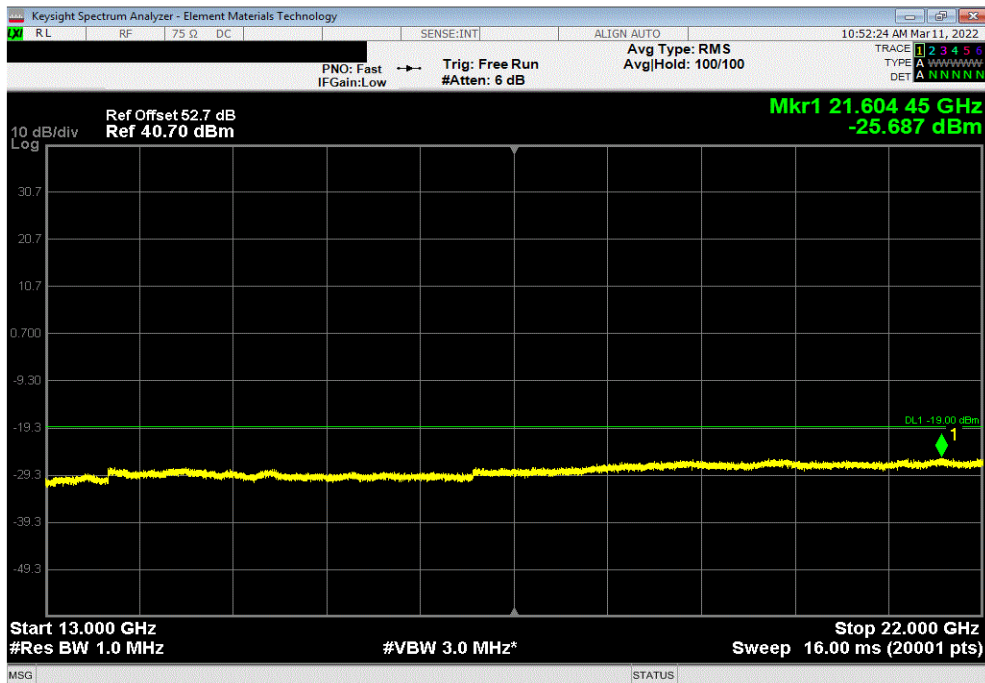


TbTx 2021.12.14.1 XMit 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 15 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
3.5 GHz - 13 GHz	-38.1	-30	Pass	



Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 15 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
13 GHz - 22 GHz	-25.7	-30	Pass	

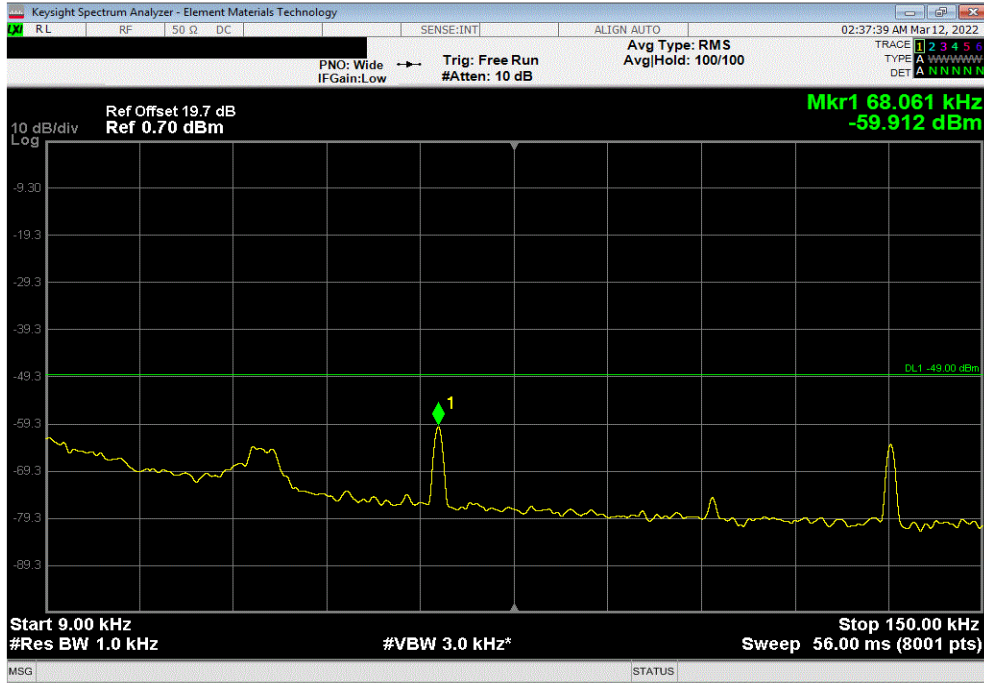


# SPURIOUS CONDUCTED EMISSIONS - IN-BAND

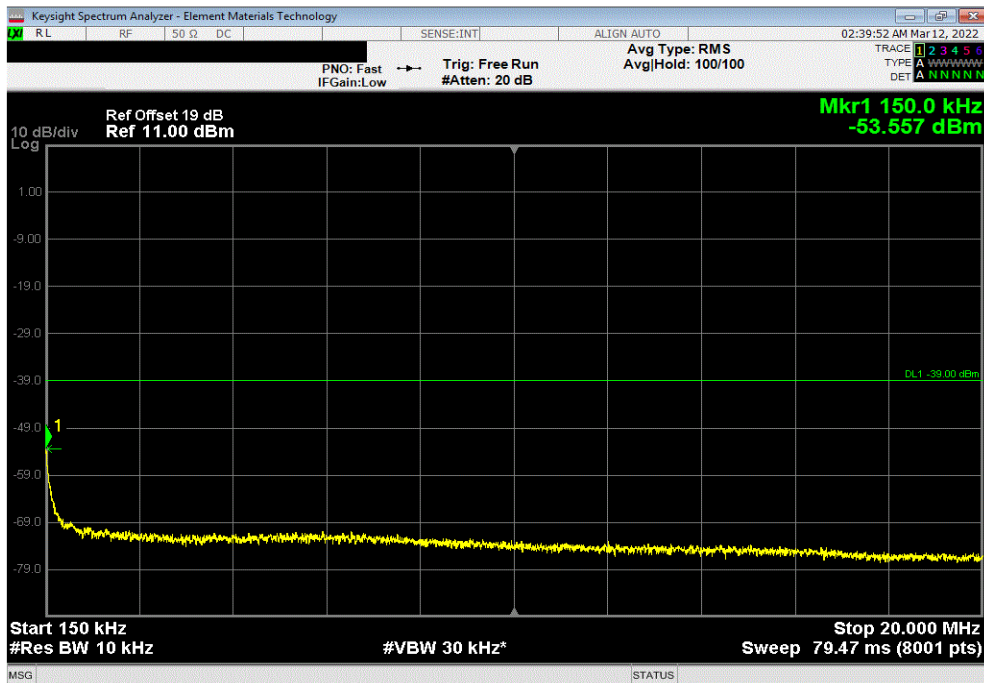


TbTx 2021.12.14.1 XMit 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 20 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz					
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result		
9 kHz - 150 kHz	-59.9	-49	Pass		



Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 20 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz					
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result		
150 kHz - 20 MHz	-53.6	-39	Pass		



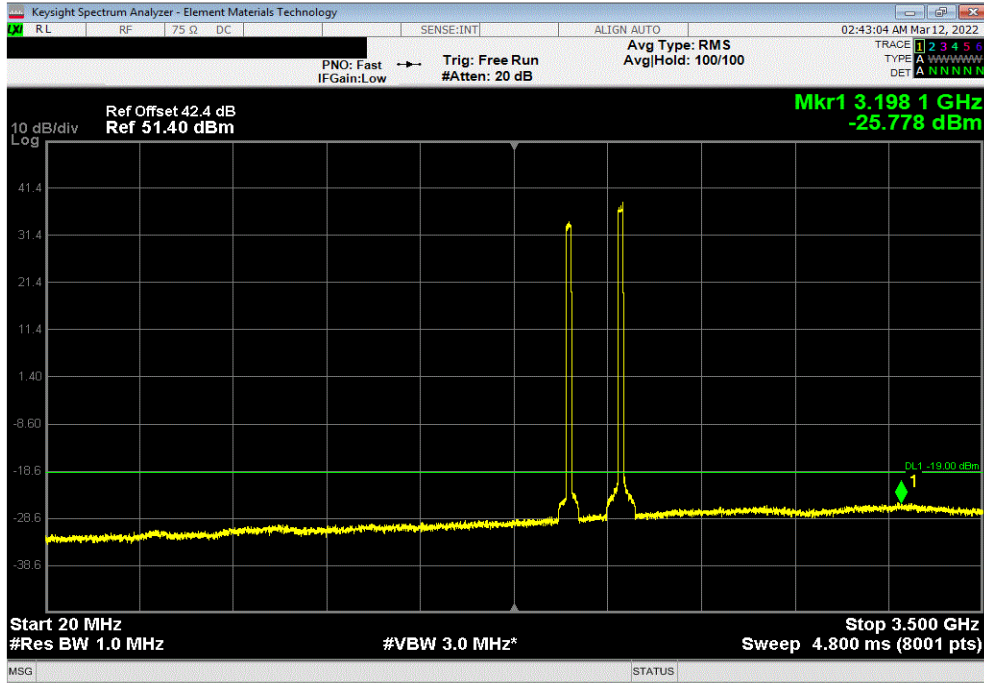


# SPURIOUS CONDUCTED EMISSIONS - IN-BAND

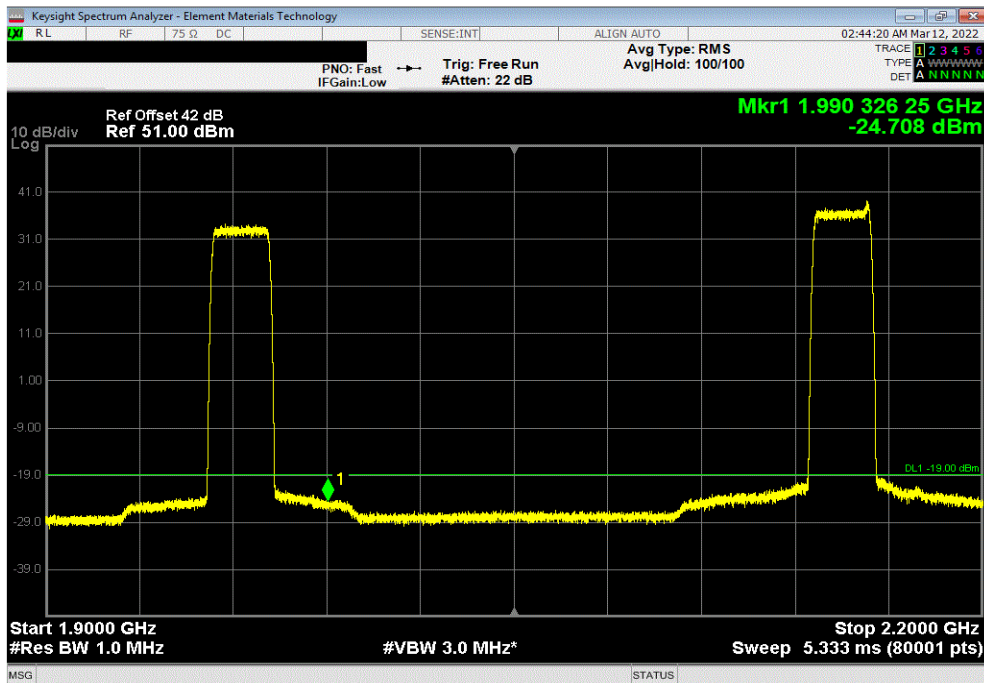


TbTx 2021.12.14.1 XMit 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 20 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
20 MHz - 3.5 GHz	-25.8	-30	Pass	



Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 20 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
1.9 GHz - 2.2 GHz	-24.7	-30	Pass	



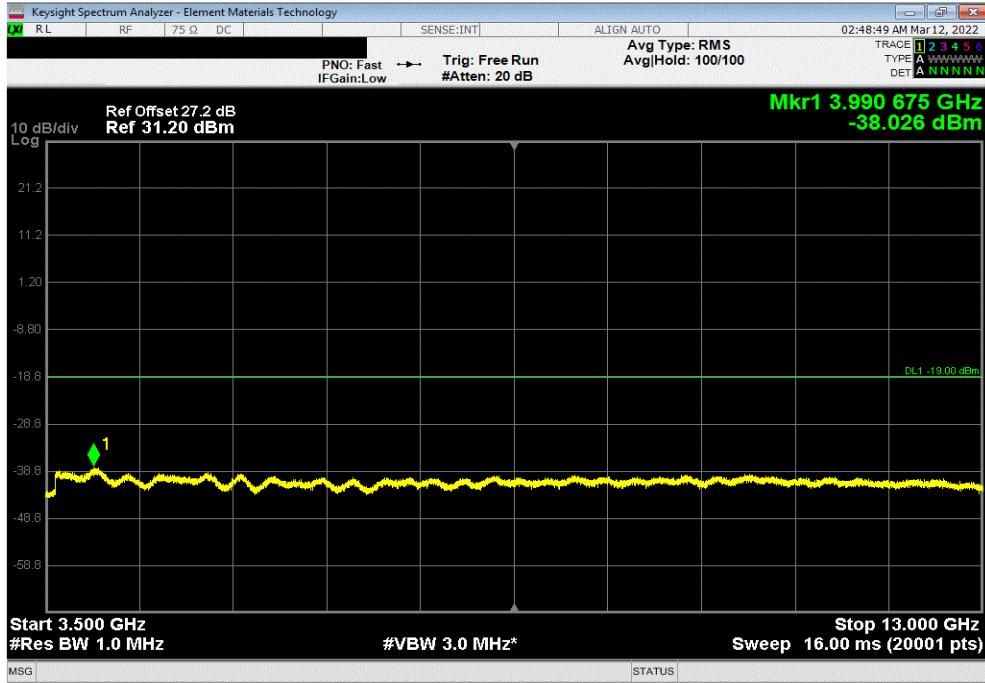


# SPURIOUS CONDUCTED EMISSIONS - IN-BAND

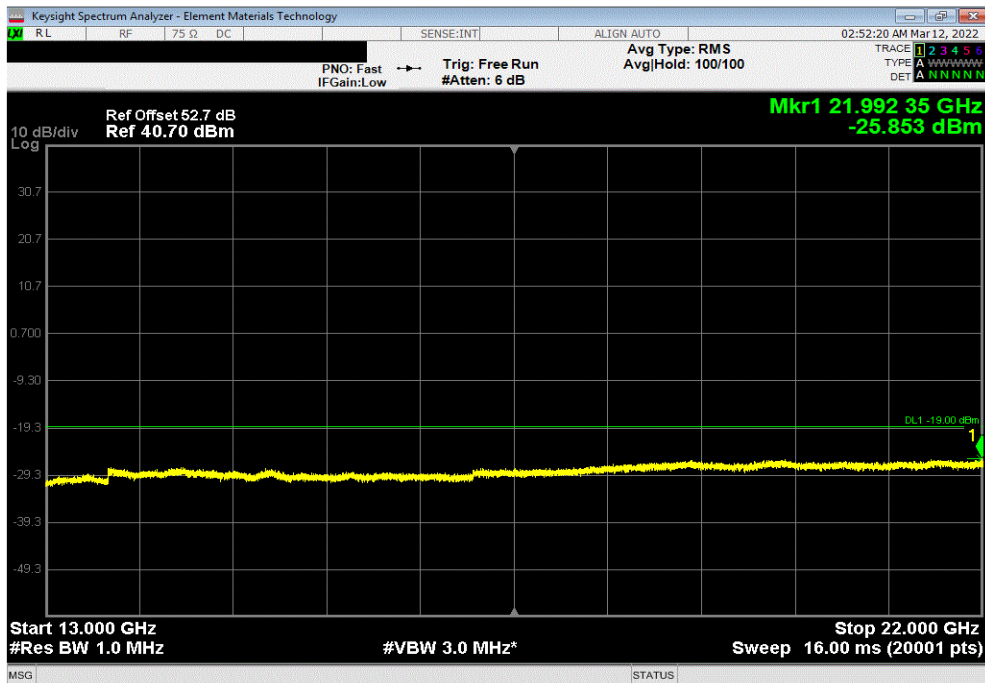


TbTx 2021.12.14.1 XMit 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 20 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
3.5 GHz - 13 GHz	-38.0	-30	Pass	



Band 66, 2110 MHz - 2200 MHz, LTE InBand, Port 1, 20 MHz Bandwidth, E-TM 1.1 with N-TM Modulation, Mid Channel, 2155 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
13 GHz - 22 GHz	-25.9	-30	Pass	



# SPURIOUS CONDUCTED EMISSIONS - STAND ALONE



XMIT 2022.02.07.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

## TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17
Block - DC	Fairview Microwave	SD3239	ANC	2022-03-02	2023-03-02
Block - DC	Fairview Microwave	SD3379	AMT	2021-09-14	2022-09-14
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2022-01-17	2023-01-17

## TEST DESCRIPTION

The antenna port spurious emissions were measured at the RF output terminal of the EUT through 4 different attenuation configurations which continues through to the RF input of the spectrum analyzer. Analyzer plots utilizing a resolution bandwidth called out by the client's test plan were made for each modulation type from 9 KHz to 22 GHz. The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, were investigated to ensure they were less than the limits also called out by the client's test plan shown below.

The measurement methods are detailed in KDB971168 D01v03 section 6 and ANSI C63.26-2015.

Per FCC 2.1057(a)(1) and RSS Gen 6.13, the upper level of measurement is the 10th harmonic of the highest fundamental frequency.

These measurements are for frequency band after the first 1.0 MHz bands immediately outside and adjacent to the frequency block.

Per section FCC 24.238(a), RSS-133 6.5 (ii), the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm for a 1 MHz measurement bandwidth. The limit is adjusted to -19 dBm [-13 dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter. RF conducted emissions testing was performed on one port. All four AFHII antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification report) and port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i and 6.4.

Per section FCC 27.53(h)(1), RSS-139 6.6 and RSS-170 5.4 & 5.4.1.2, the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm for a 1 MHz measurement bandwidth. The limit is adjusted to -19 dBm [-13 dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter.

The limit for the 9kHz to 150kHz frequency range was adjusted to -49dBm to correct for a spectrum analyzer RBW of 1kHz versus required RBW of 1MHz [i.e.: -49dBm = -19dBm -10log(1MHz/1kHz)]. The limit for the 150kHz to 20MHz frequency range was adjusted to -39dBm to correct for a spectrum analyzer RBW of 10kHz versus required RBW of 1MHz [i.e.: -39dBm = -19dBm -10log(1MHz/10kHz)]. The required limit of -19dBm with a RBW of > 1MHz was used for all other frequency ranges.

# SPURIOUS CONDUCTED EMISSIONS - STAND ALONE



Tel: 2021.12.14.1 XMI: 2022.02.07.0

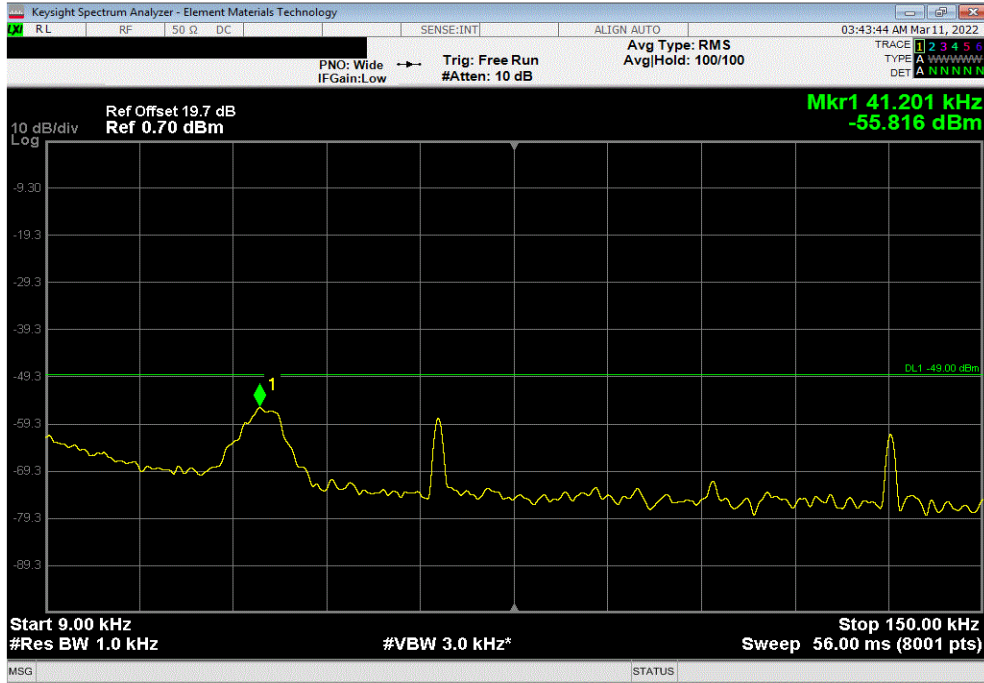
EUT: AHFII Remote Radio Head		Work Order: NOKI0037	
Serial Number: YK214000036		Date: 18-Mar-22	
Customer: Nokia Solutions and Networks		Temperature: 22.7 °C	
Attendees: David Le, John Rattanavong		Humidity: 38.7% RH	
Project: None		Barometric Pres.: 1017 mbar	
Tested by: Brandon Hobbs		Power: 54 VDC	
		Job Site: TX01	
<b>TEST SPECIFICATIONS</b>			
FCC 27:2022		ANSI C63.26:2015	
RSS-139 Issue 3:2015		RSS-139 Issue 3:2015	
FCC 24E:2022		ANSI C63.26:2015	
RSS-133 Issue 6: 2013+A1:2018		RSS-132 Issue 3:2013	
RSS-170 Issue 3:2015		RSS-170 Issue 3:2015	
COMMENTS: All measurement path losses accounted for in the reference level offset including any attenuators, filters, and DC blocks. The Band 25 NB IoT Standalone Carrier was enabled at maximum power of			
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			
Configuration #	1,2,3,4	Signature	
		Frequency Range	Max Value (dBm) Limit < (dBm) Result
Band 25, 1930 MHz - 1995 MHz, LTE Stand-alone			
Port 1			
200kHz Modulation			
N-TM Modulation			
	Mid Channel, 1962.5 MHz	9 kHz - 150 kHz	-55.8 -49 Pass
	Mid Channel, 1962.5 MHz	150 kHz - 20 MHz	-53.1 -39 Pass
	Mid Channel, 1962.5 MHz	20 MHz - 3.5 GHz	-26.3 -19 Pass
	Mid Channel, 1962.5 MHz	1.9 GHz - 2.2 GHz	-25.1 -19 Pass
	Mid Channel, 1962.5 MHz	3.5 GHz - 13 GHz	-38.2 -19 Pass
	Mid Channel, 1962.5 MHz	13 GHz - 22 GHz	-25.8 -19 Pass

# SPURIOUS CONDUCTED EMISSIONS - STAND ALONE

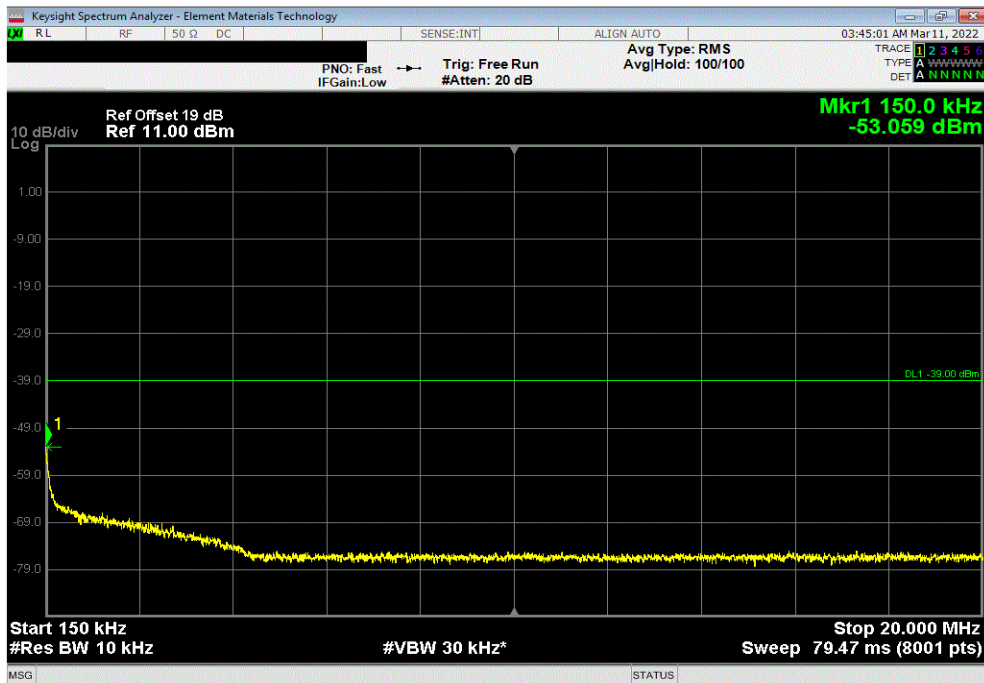


TbTx 2021.12.14.1 XMI 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Stand-alone, Port 1, 200kHz Modulation, N-TM Modulation, Mid Channel, 1962.5 MHz					
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result		
9 kHz - 150 kHz	-55.8	-49	Pass		



Band 25, 1930 MHz - 1995 MHz, LTE Stand-alone, Port 1, 200kHz Modulation, N-TM Modulation, Mid Channel, 1962.5 MHz					
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result		
150 kHz - 20 MHz	-53.1	-39	Pass		

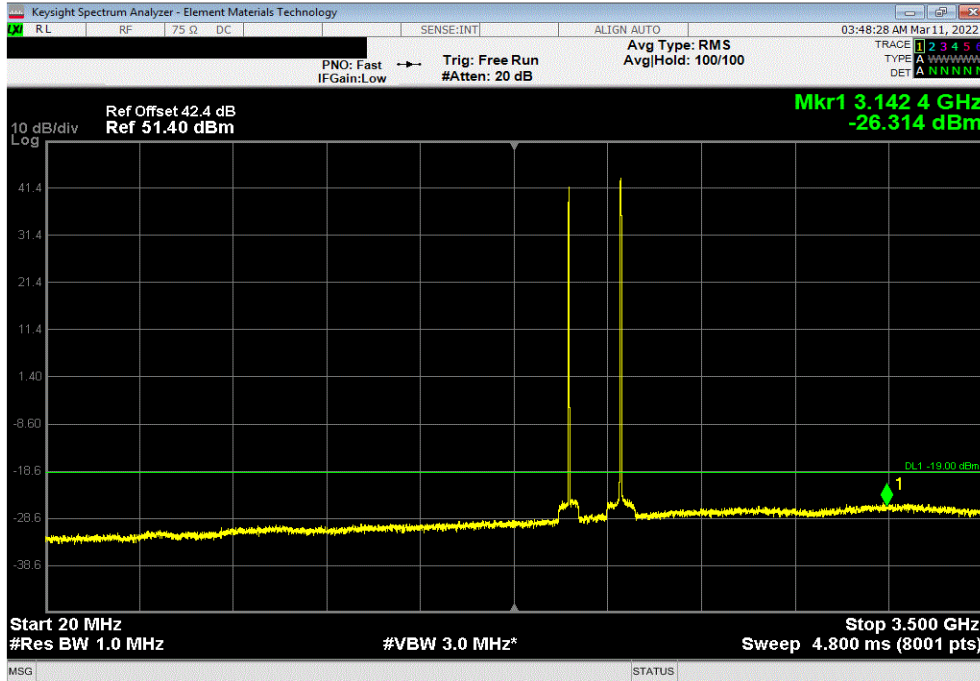


# SPURIOUS CONDUCTED EMISSIONS - STAND ALONE

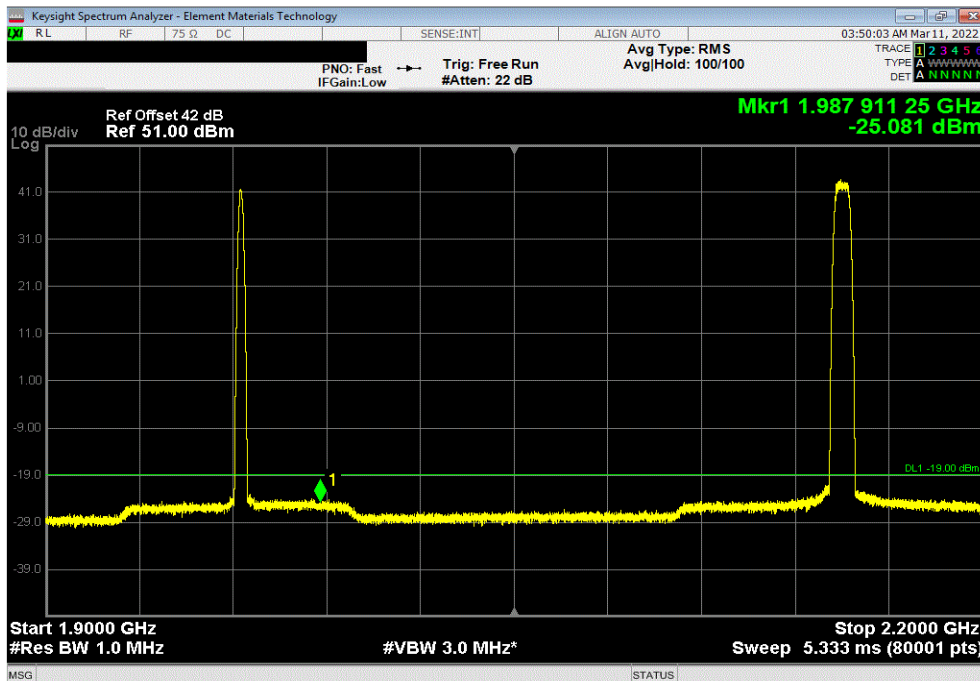


TbTx 2021.12.14.1 XMI 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Stand-alone, Port 1, 200kHz Modulation, N-TM Modulation, Mid Channel, 1962.5 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
20 MHz - 3.5 GHz	-26.3	-19	Pass	



Band 25, 1930 MHz - 1995 MHz, LTE Stand-alone, Port 1, 200kHz Modulation, N-TM Modulation, Mid Channel, 1962.5 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
1.9 GHz - 2.2 GHz	-25.1	-19	Pass	

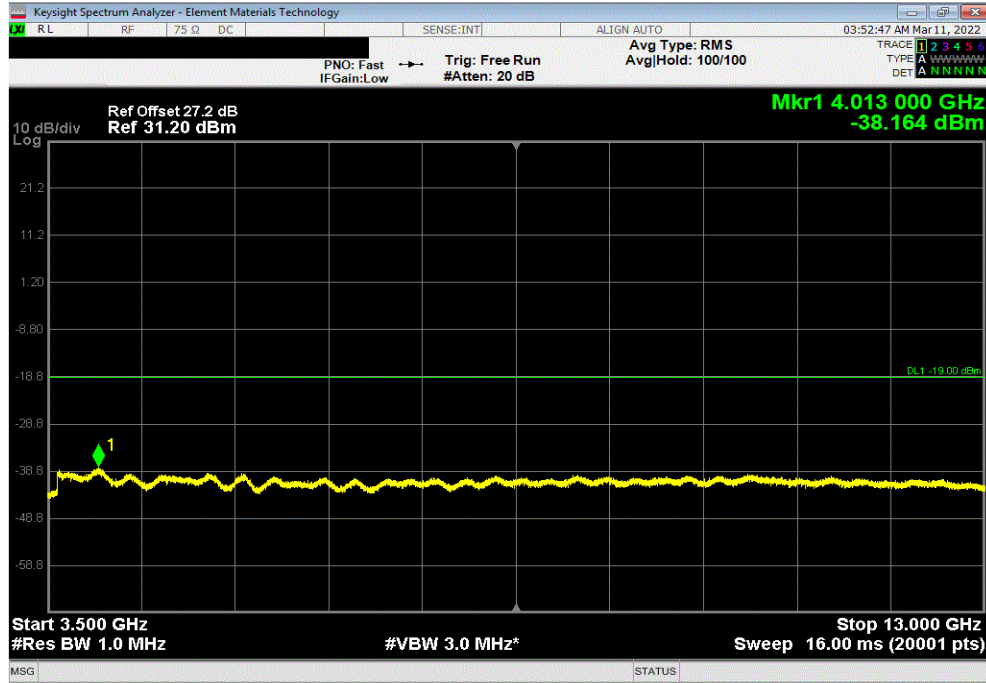


# SPURIOUS CONDUCTED EMISSIONS - STAND ALONE

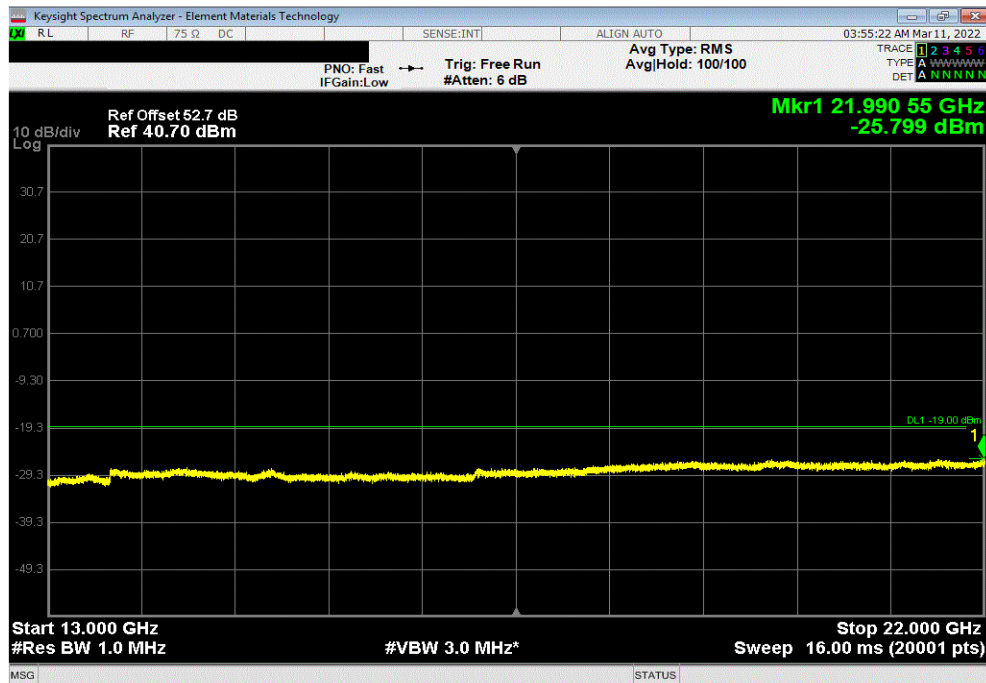


TbTx 2021.12.14.1 XMI 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Stand-alone, Port 1, 200kHz Modulation, N-TM Modulation, Mid Channel, 1962.5 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
3.5 GHz - 13 GHz	-38.2	-19	Pass	



Band 25, 1930 MHz - 1995 MHz, LTE Stand-alone, Port 1, 200kHz Modulation, N-TM Modulation, Mid Channel, 1962.5 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
13 GHz - 22 GHz	-25.8	-19	Pass	





# SPURIOUS CONDUCTED EMISSIONS - STAND ALONE



Tel: 2021.12.14.1 XMI: 2022.02.07.0

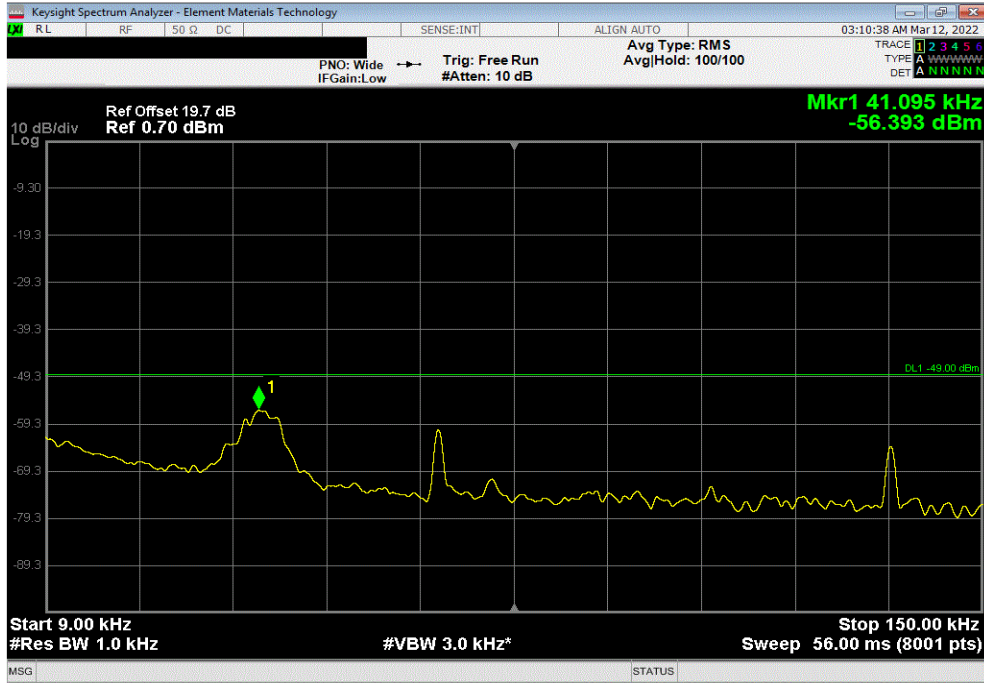
EUT: AHFII Remote Radio Head		Work Order: NOKI0037	
Serial Number: YK214000036		Date: 18-Mar-22	
Customer: Nokia Solutions and Networks		Temperature: 22.3 °C	
Attendees: David Le, John Rattanavong		Humidity: 37.9% RH	
Project: None		Barometric Pres.: 1019 mbar	
Tested by: Brandon Hobbs		Power: 54 VDC	
Job Site: TX01			
<b>TEST SPECIFICATIONS</b>			
FCC 24E:2022		ANSI C63.26:2015	
RSS-133 Issue 6: 2013+A1:2018		RSS-132 Issue 3:2013	
FCC 27:2022		ANSI C63.26:2015	
RSS-139 Issue 3:2015		RSS-139 Issue 3:2015	
RSS-170 Issue 3:2015		RSS-170 Issue 3:2015	
<b>COMMENTS</b>			
All measurement path losses accounted for in the reference level offset including any attenuators, filters, and DC blocks. The Band 66 NB IoT Standalone Carrier was enabled at maximum power of 20W/carrier.			
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			
Configuration #	1,2,3,4	Signature	
		Frequency Range	Max Value (dBm)
			Limit < (dBm)
			Result
Band 66, 2110 MHz - 2200 MHz, LTE Standalone			
Port 1			
200 kHz Bandwidth			
N-TM Modulation			
Mid Channel, 2155 MHz		9 kHz - 150 kHz	-56.4
Mid Channel, 2155 MHz		150 kHz - 20 MHz	-53.3
Mid Channel, 2155 MHz		20 MHz - 3.5 GHz	-25.9
Mid Channel, 2155 MHz		1.9 GHz - 2.2 GHz	-25.09
Mid Channel, 2155 MHz		3.5 GHz - 13 GHz	-38.1
Mid Channel, 2155 MHz		13 GHz - 22 GHz	-25.9
			-49
			-39
			-19
			-19
			-19
			-19

# SPURIOUS CONDUCTED EMISSIONS - STAND ALONE

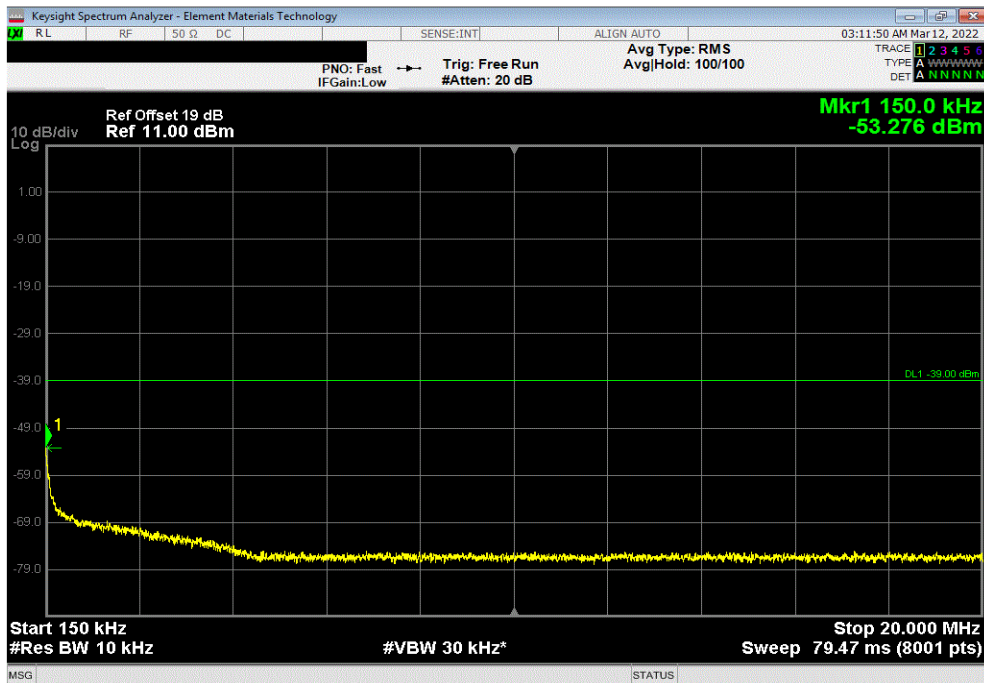


TbTx 2021.12.14.1 XMI 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE Standalone, Port 1, 200 kHz Bandwidth, N-TM Modulation, Mid Channel, 2155 MHz					
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result		
9 kHz - 150 kHz	-56.4	-49	Pass		



Band 66, 2110 MHz - 2200 MHz, LTE Standalone, Port 1, 200 kHz Bandwidth, N-TM Modulation, Mid Channel, 2155 MHz					
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result		
150 kHz - 20 MHz	-53.3	-39	Pass		

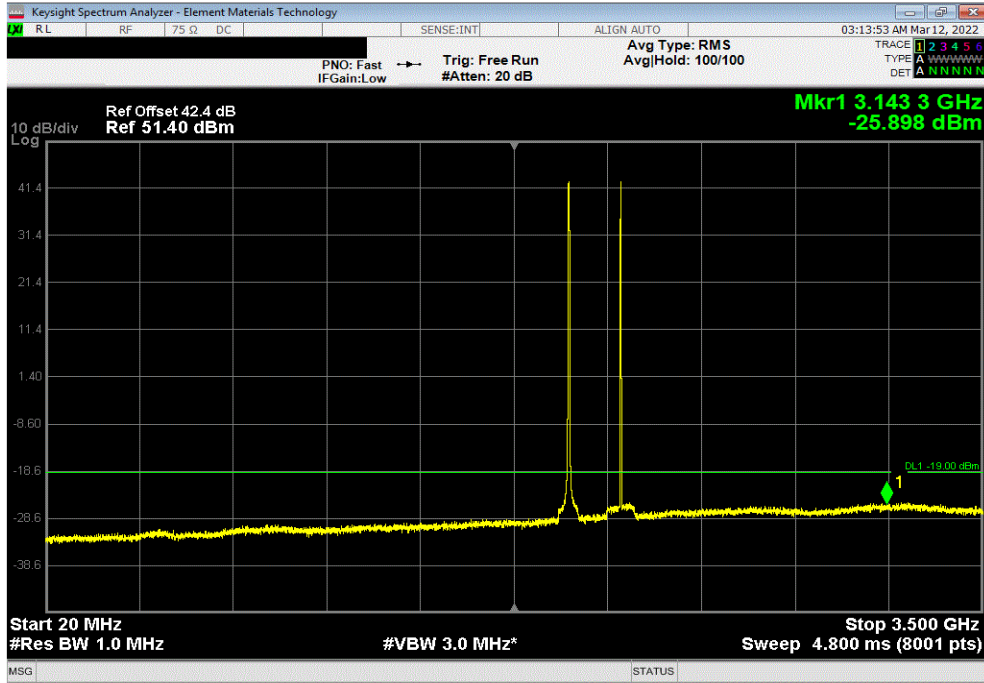


# SPURIOUS CONDUCTED EMISSIONS - STAND ALONE

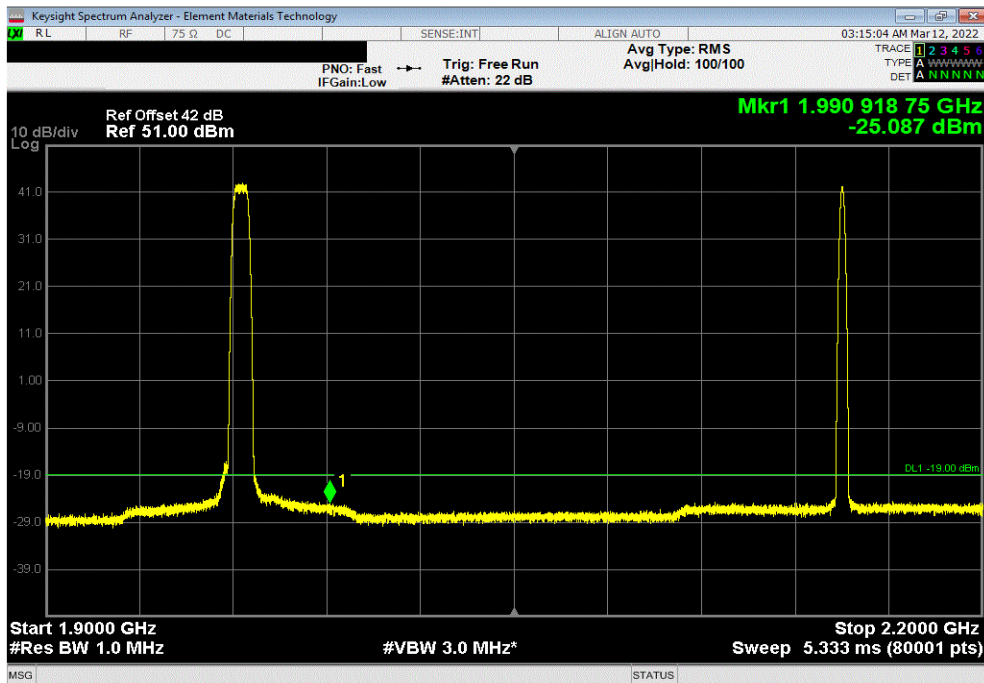


TbTx 2021.12.14.1 XMit 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE Standalone, Port 1, 200 kHz Bandwidth, N-TM Modulation, Mid Channel, 2155 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
20 MHz - 3.5 GHz	-25.9	-19	Pass	



Band 66, 2110 MHz - 2200 MHz, LTE Standalone, Port 1, 200 kHz Bandwidth, N-TM Modulation, Mid Channel, 2155 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
1.9 GHz - 2.2 GHz	-25.09	-19	Pass	

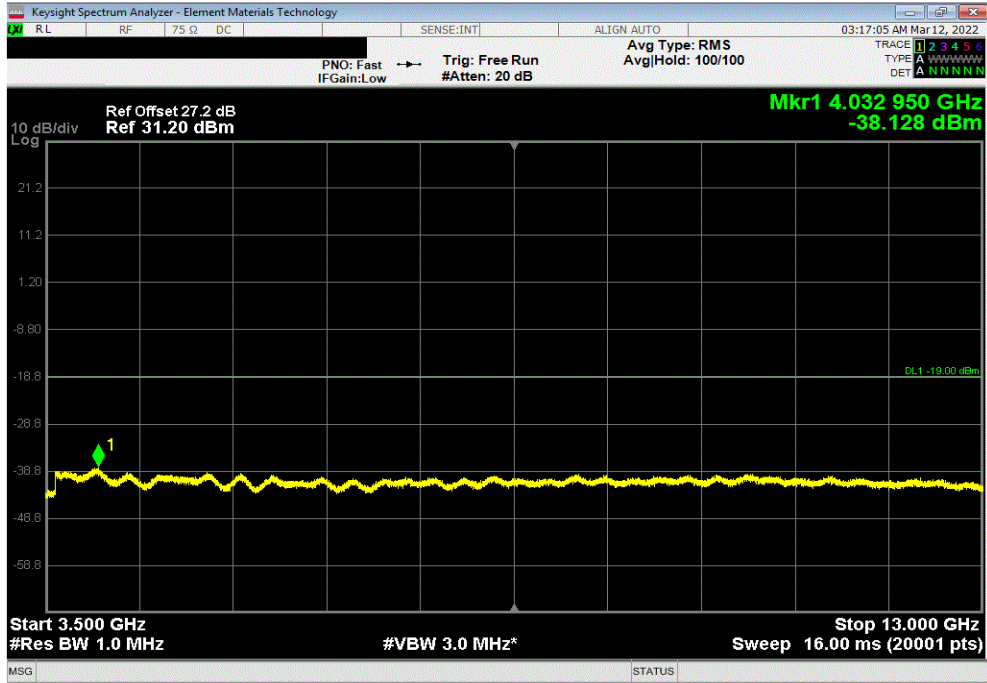


# SPURIOUS CONDUCTED EMISSIONS - STAND ALONE



TbTx 2021.12.14.1 XMit 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE Standalone, Port 1, 200 kHz Bandwidth, N-TM Modulation, Mid Channel, 2155 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
3.5 GHz - 13 GHz	-38.1	-19	Pass	



Band 66, 2110 MHz - 2200 MHz, LTE Standalone, Port 1, 200 kHz Bandwidth, N-TM Modulation, Mid Channel, 2155 MHz				
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
13 GHz - 22 GHz	-25.9	-19	Pass	

